SPECIAL ISSUE! THIRD ANNUAL SOFTWARE REVIEW!

PC WORLD

JULY 1989 $2.95 CANADA $3.95

POWER WORD PROCESSORS
HOW THE HEAVYWEIGHTS STACK UP

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We Test 7 Packages for Ease of Use

DATA BASE SHOOT-OUT
dBASE IV Meets Paradox, R:base, and DataEase

DRAWING SOFTWARE
5 PC Packages Challenge the Mac

Technically speaking, the System 325 is the most advanced 386™ computer we've ever built. And, according to PC Magazine, it's one of the most advanced 386 computers they've ever tested.

In benchmark after benchmark, the Dell System 325 25 MHz ran circles around a field of 386-based systems. A field that included the Compaq^ 386/25.

A show of prowess that earned the System 325 PC Magazine's Editor's Choice award.

It was a goal we set for ourselves from the very beginning. And an objective anyone with a penchant for power and performance can appreciate.

A PERSONAL COMPUTER THAT'S REALLY PERSONAL.

Of the more than 150,000 personal computers we've sold to date, each one's been individually configured to fit the needs of its owner.

The System 325 takes that idea to its logical extreme.

For example, it runs either MS-DOS®, OS/2, or our own Dell UNIX® System V. Which is compatible with AT&T's System V Interface Definition. And the world of XENIX® applications.

If speed is of the essence, we can include an optional Intel^ 80387 or WEITEK 3167 math coprocessor. And since nothing about this system is lightweight, the standard mass storage is a 100 MB IDE disk drive. Or we can configure it with a 150 or 322 MB unit.

As you might expect, the output is just as intense. You can choose between VGA mono with paperwhite screen, or VGA Color

THE DELL 386 SYSTEM 325 HAS A 25 MHz CLOCK RATE, CACHE MEMORY CONTROLLER, 100 MB 25ms IDE DRIVE, PAGE MODE INTERLEAVED MEMORY, AND 100% COMPATIBILITY WITH MS-DOS, OS/2 AND UNIX SYSTEM V.

Plus, for high resolution colors displayed on a larger screen.

Even though the 325 gives you all this performance, it still leaves you six open slots for whatever else you might want to add.

And once you've told us what you want, we'll make sure what you want works—by burning-in the entire system unit.

COMPUTER RETAILERS ARE NO KNOWS.

In all probability, the average computer retailer won't have any understanding what makes the System 325 go.

He will, however, be quite aware of the fact that he could add a 35% markup if he could sell it in his store.

Which he can't.

Because we sell direct.

Meaning you now have the unique opportunity to talk directly with a computer expert. And ask things like, "What's the difference between IDE and ESDI?" Or, "How much SIMM RAM should I add?"

In other words, the kinds of questions you should be able to ask a retailer, but usually can't.

So as you might suspect, dealing direct not only saves you the 35% markup, but 100% of the aggravation.

WE COME WHEN WE'RE CALLED.

One of the things that very clearly sets a Dell system apart from other computers is not just how they're sold, but how they're supported.

Overkill was one description used in a PC Week article.

Perhaps.

But then, we think you'll agree, when something goes wrong, you want as much help as possible, right?

Which is why every Dell system comes with a toll-free technical support line and self-diagnostic software. We're able to solve 90% of all problems right over the phone. The other 10% receive next-day, deskside service. Thanks to our new alliance with Xerox Corporation.

And you get all this help for a full year—whenever you need it—at no extra charge.△

As you've probably guessed, one of the things that drives us most is customer satisfaction.

So we'd like to give you the ultimate guarantee: Try a System 325 in your office for a month. Run your toughest applications. Put it through its paces, at your pace. If you're not completely satisfied, send it back anytime within 30 days. And we'll refund your money.

No questions asked.

MAYBE YOU SHOULDN'T BUY ONE AFTER ALL.

No matter how many reasons we give you to buy a Dell system, sometimes it makes more sense to lease one instead.

BEST OF ALL, YOU WON'T HAVE TO EXPLAIN TO A COMPUTER RETAILER WHAT ALL THAT MEANS.

Whether you need a single computer, or an office full, a leasing plan is like 100% financing.

And just as we can custom configure your computers, we can see to it you get a custom designed lease plan to fit your exact business needs.† A fact that has not gone unnoticed. Especially by the Fortune 500. Over half of whom now own or lease Dell systems.

And just as we welcome their business, we welcome your business, too. Just call us, toll-free. And don't be afraid to ask us the tough questions.

That's the part we like best.

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CORPORATION

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AD CODE NO. 11DG9

DOT MATRIX PRINTERS.

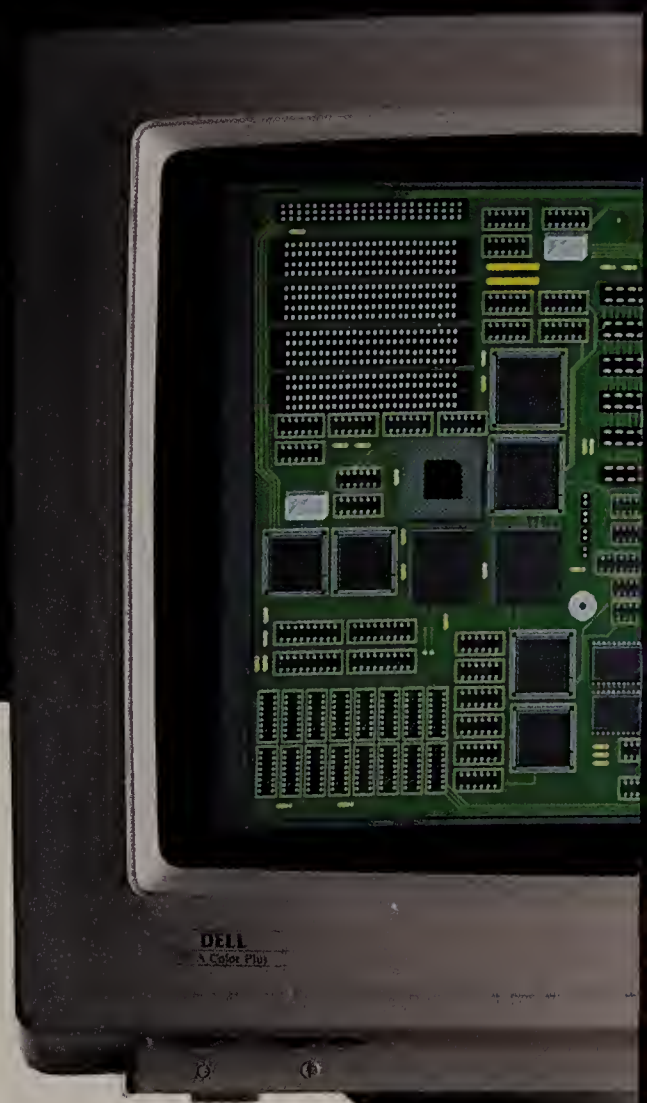
Printer System 800: $699.95
Our highest resolution text and graphics, 24-pin dot matrix printer. Draft quality at 200 cps. Letter quality at 66 cps. Parallel and serial interfaces.Wide carriage.

Printer System 600: $499.95
9-pin dot matrix. Draft quality at 240 cps. Near-letter quality at 60 cps. Parallel interface. Wide carriage.

Printer System 300: $199.95
9-pin dot matrix. Draft quality at 144 cps. Near-letter quality at 36 cps. Four standard fonts. Parallel interface. Narrow carriage.

LASER PRINTERS.

SO HOW COME YOU NEVER CALL?



THE DELL SYSTEM 325 DELL 25 MHz 386

PC MAGAZINE EDITOR'S CHOICE

"The new top-of-the-line Dell System 325 is a flagship worth putting out in front of the fleet."
February 14, 1989

STANDARD FEATURES:

- Intel 80386 microprocessor running at 25 MHz.
- Choice of 1 MB, 2 MB or 4 MB of RAM* expandable to 16 MB using a dedicated high speed 32-bit memory slot.
- Advanced Intel 82385 Cache Memory Controller with 32 KB of high speed static RAM cache.
- Page mode interleaved memory architecture.
- VGA systems include a high performance 16-bit video adapter.
- Socket for 25 MHz Intel 80387 or 25 MHz WEITEK 3167 math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Dual diskette and hard disk drive controller.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 200-watt power supply.
- 8 industry standard expansion slots.

OPTIONS:

- 40 MB or 150 MB tape backup.
- 25 MHz Intel 80387 math coprocessor.
- 25 MHz WEITEK 3167 math coprocessor.
- 1 MB or 4 MB RAM upgrade kit.
- 2 MB or 8 MB memory expansion board kit.
- Graphics Performance Accelerator GPX-1024.
- Graphics Performance Display GPD-16C, GPD-19C.

Lease for as low as $199/Month.

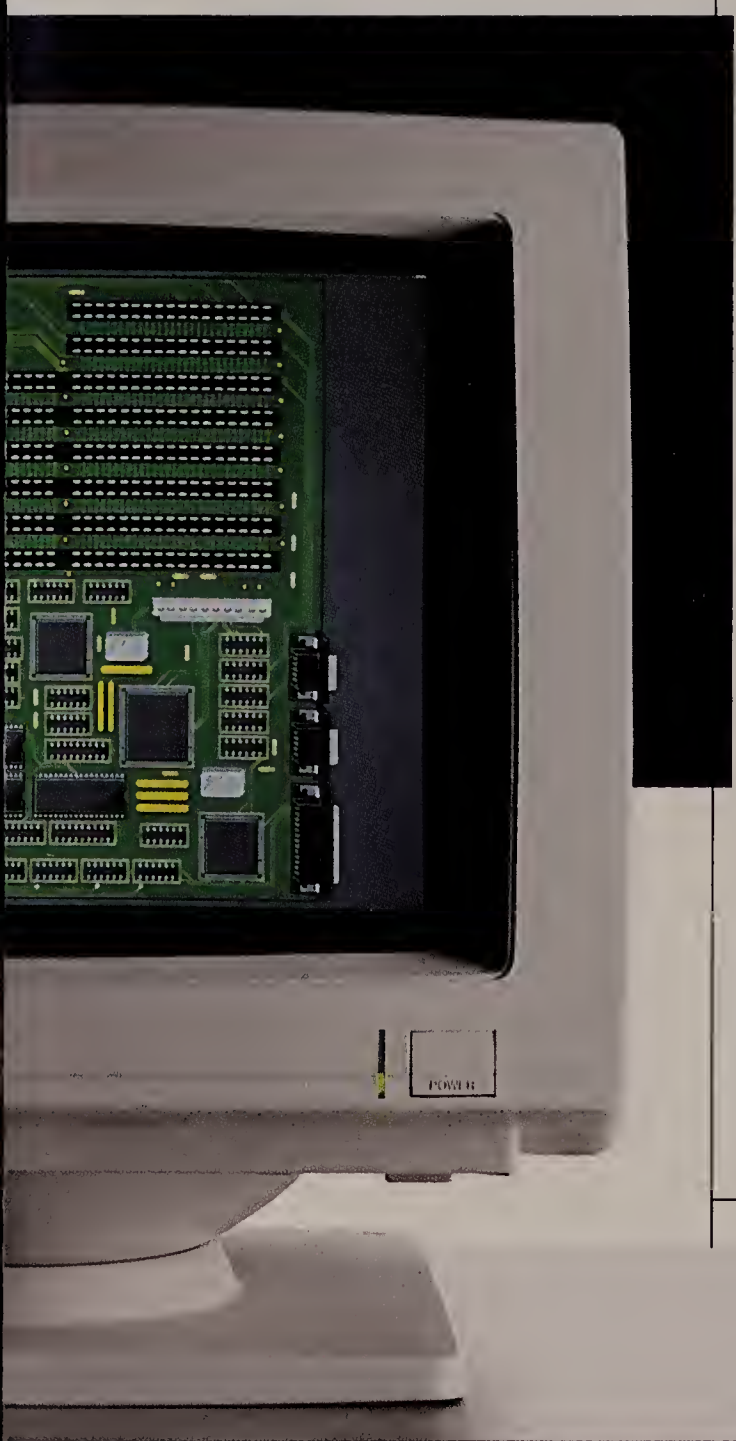
◇ ***Extended Service Plan pricing starts at $370.***

System 325	With Monitor & Adapter			
	VGA Mono		VGA Color Plus	
Hard Disk Drive	1MB RAM	2MB RAM	1MB RAM	2MB RAM
40 MB-29 ms IDE	$5,499	$5,698	$5,799	$5,998
100 MB-25 ms IDE	$5,999	$6,198	$6,299	$6,498
150 MB-18 ms ESDI	$6,499	$6,698	$6,799	$6,998
322 MB-18 ms ESDI	$7,299	$7,498	$7,599	$7,798

Disclaimer: All systems are photographed with optional extras, which some computer retailers won't even recognize.

Laser System 150, 15 pages per minute: $5,995.
Laser System 80, 8 pages per minute: $3,295.
Laser System 60, 6 pages per minute: $2,195.

All Dell laser printers come with 1.5 MB RAM, full-page 300 DPI graphics, and have 31 standard fonts (7 resident and 24 downloadable from diskette). Dell laser printers also provide Hewlett-Packard LaserJet Plus,^ Epson/FX,^ IBM Proprinter^ and Diablo 630^ emulations.



THE DELL SYSTEM 310 20 MHz 386.

The best combination of performance and value available.

STANDARD FEATURES:

- Intel 80386 microprocessor running at 20 MHz.
- Choice of 1 MB, 2 MB or 4 MB of RAM* expandable to 16 MB using a dedicated high speed 32-bit memory slot.
- Advanced Intel 82385 Cache Memory Controller with 32 KB of high speed static RAM cache.
- Page mode interleaved memory architecture.
- VGA systems include a high performance 16-bit video adapter.
- Socket for 20 MHz Intel 80387 or 20 MHz WEITEK 3167 math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Dual diskette and hard disk drive controller.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 200-watt power supply.
- 8 industry standard expansion slots.

OPTIONS:

- 40 MB or 150 MB tape backup
- 20 MHz Intel 80387 math coprocessor.
- 20 MHz WEITEK 3167 math coprocessor.
- 1 MB or 4 MB RAM upgrade kit.
- 2 MB or 8 MB memory expansion board kit.
- Graphics Performance Accelerator GPX-1024.
- Graphics Performance Display GPD-16C, GPD-19C.

***Lease for as low as $135/Month.
◇ Extended Service Plan pricing starts at $251.***

System 310	With Monitor & Adapter			
Hard Disk Drives	TTL Mono		VGA Color Plus	
	1 MB RAM	2 MB RAM	1 MB RAM	2 MB RAM
40 MB-29 ms IDE	$3,699	$3,898	$4,199	$4,398
100 MB-25 ms IDE	$4,199	$4,398	$4,699	$4,898
150 MB-18 ms ESDI	$4,699	$4,898	$5,199	$5,398
322 MB-18 ms ESDI	$5,499	$5,698	$5,999	$6,198

THE NEW DELL SYSTEM 316 16 MHz 386SX.™

Expandable, affordable access to 386 architecture.

STANDARD FEATURES:

- Intel 80386SX microprocessor running at 16 MHz.
- Choice of 1MB, 2 MB or 4 MB of RAM* expandable to 16MB (8 MB on the system board).
- Page mode interleaved memory architecture.
- VGA systems include a high performance 16-bit video adapter
- LIM 4.0 support for memory over 1 MB.
- Socket for 16 MHz Intel 80387SX math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Integrated high performance hard disk interface and diskette controller on system board. (ESDI based systems include a hard disk controller.)
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 200-watt power supply.
- 8 industry standard expansion slots.

OPTIONS:

- 40 MB or 150 MB tape backup.
- 16 MHz Intel 80387SX math coprocessor.
- 1 MB or 4 MB RAM upgrade kit.
- Graphics Performance Accelerator GPX-1024.
- Graphics Performance Display GPD-16C, GPD-19C.

***Lease for as low as $112/Month
◇ Extended Service Plan pricing starts at $234.***

System 316	With Monitor & Adapter			
Hard Disk Drives	TTL Mono		VGA Color Plus	
	1 MB RAM	2 MB RAM	1 MB RAM	2 MB RAM
40 MB-29 ms IDE	$2,999	$3,198	$3,499	$3,698
100 MB-25 ms IDE	$3,599	$3,798	$4,099	$4,298
150 MB-18 ms ESDI	$4,099	$4,298	$4,599	$4,798
322 MB-18 ms ESDI	$5,099	$5,298	$5,599	$5,798

THE DELL SYSTEM 200 12.5 MHz 286.

This full-featured 286 computer runs at 12.5 MHz, and is completely Microsoft MS-DOS and MS OS/2 compatible.

STANDARD FEATURES:

- 80286 microprocessor running at 12.5 MHz.
- 640 KB of RAM expandable to 16 MB (4.6 MB on system board).
- Socket for Intel 80287 math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Dual diskette and hard disk drive controller.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 200-watt power supply.
- 6 industry standard expansion slots.

OPTIONS:

- 40 MB or 150 MB tape backup.
- Intel 80287 math coprocessor.
- 512 KB RAM upgrade kit.
- 2 MB RAM update kit.

***Lease for as low as $64/Month.
◇ Extended Service Plan pricing starts at $166.***

System 200	With Monitor & Adapter	
Hard Disk Drives	TTL Mono	VGA Color
20 MB	$1,699	$2,099
40 MB-29 ms IDE	$1,999	$2,399
100 MB-25 ms IDE	$2,599	$2,999
150 MB-18 ms ESDI	$3,099	$3,499
322 MB-18 ms ESDI	$3,899	$4,299

Performance Enhancements (Systems 325, 310 and 316) Within the first megabyte of memory, 384 KB of memory is reserved for use by the system to enhance performance.

4 MB configurations available on all systems. Call for pricing.

APPLICATION SOFTWARE.

We offer a complete line of software. Everything from complex CAD/CAM applications to fun flight simulator programs. All at extremely competitive prices.

OPERATING SYSTEM SOFTWARE.

Dell Enhanced Microsoft® MS-DOS® 3.3: $99.95.
Dell Enhanced Microsoft MS-DOS 4.0: $119.95.
(Both MS-DOS versions with disk cache and other utilities)
Dell Enhanced MS® OS/2 Standard Edition 1.0: $324.95.
Dell UNIX® System V/386, Release 3.2:
Now Available. Call for details.

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Plus, for high resolution colors displayed on a larger screen.

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And just as we welcome their business, we welcome your business, too. Just call us, toll-free. And don't be afraid to ask us the tough questions.

That's the part we like best.

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Product Information We're always interested in new products for our news and review sections. Send press releases and product announcements to Rex Farrance, assistant editor (software), or Janet Walden, assistant editor (hardware), at *PC World*, 501 Second St., San Francisco, CA 94107, or electronically to MCI Mail PCWORLD/179-3813, CompuServe 74055,412, or The Source STE908.

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Volume 1, No. 5.

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They Cover the Software Front

PC World's 1989 software all-stars: Mike Goodwin, Eric Brown, Scott Spanbauer, Anita Amirrezvani, Wes Nihei

ROBERT CARDIN

This month you won't find our usual mix of features, productivity-boosting how-to articles, and hardware and software reviews. But that's not an apology—far from it. For the third straight year, our July software-only issue brings together more than 30 products in a half-dozen groundbreaking categories.

The editors pictured above are responsible for the six roundups that make up our 1989 Annual Software Review. And although the six reviews represent dramatically different application areas, one message runs through them all: Strong competition makes for good software.

Assistant Editor Wes Nihei coordinated our lead review, "Advanced Word Processors—Familiar Faces, New Features." *WordPerfect* and *Microsoft Word*, our Best Buy honorees, have set a high standard for topflight word processors.

Anyone who thinks the paperless office is just around the corner hasn't spent much time lately in the typical office. Fortunately, forms-creation software takes the drudgery out of dealing with the ubiquitous business form. Associate Editor Mike Goodwin ("The Best in Forms Software") found proof that you don't need desktop publishing to polish your everyday business documents.

Data base guru Tony Lima prepared "Data Base Powerhouses Strike a Balance" under the supervision of Associate Editor Eric Brown. *Paradox* and *dBASE IV* are the clear leaders in their category, thanks to a winning blend of developer-strength programming muscle and user-friendly front ends. With *dBASE IV* in particular, Ashton-Tate has succeeded in setting a standard for other data management software to surpass.

If your business lives and breathes by its financials, don't miss "Net Gains in Multiuser Accounting." Senior Associate Editor Anita Amirrezvani and reviewer Ralph Soucie assembled the comprehensive Features Evaluation at the heart of that review. The most impressive network payoff, though, may come from a new category of application software. Eric Brown—who had a busy month—collaborated with reviewers Paul Christiansen, Steve King, and Mark Munger on "Groupware: E-Mail Meets Scheduling." With powerful messaging, calendaring, and project management features, these products can turn a network's physical links into strong personal connections.

Finally, who says you can't create sharp, forceful images on the PC? Assistant Editor Scott Spanbauer ("Well-Rounded Drawing") found five object-based drawing packages that promise a new era of graphics sophistication for PC users. ●

Ed Bott

Ed Bott
Managing Editor

We had these two talking in no time at all.

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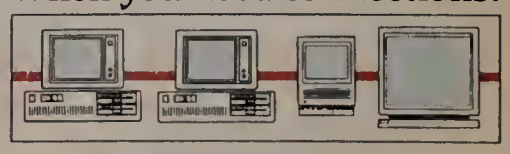

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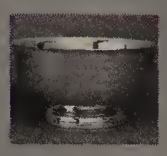

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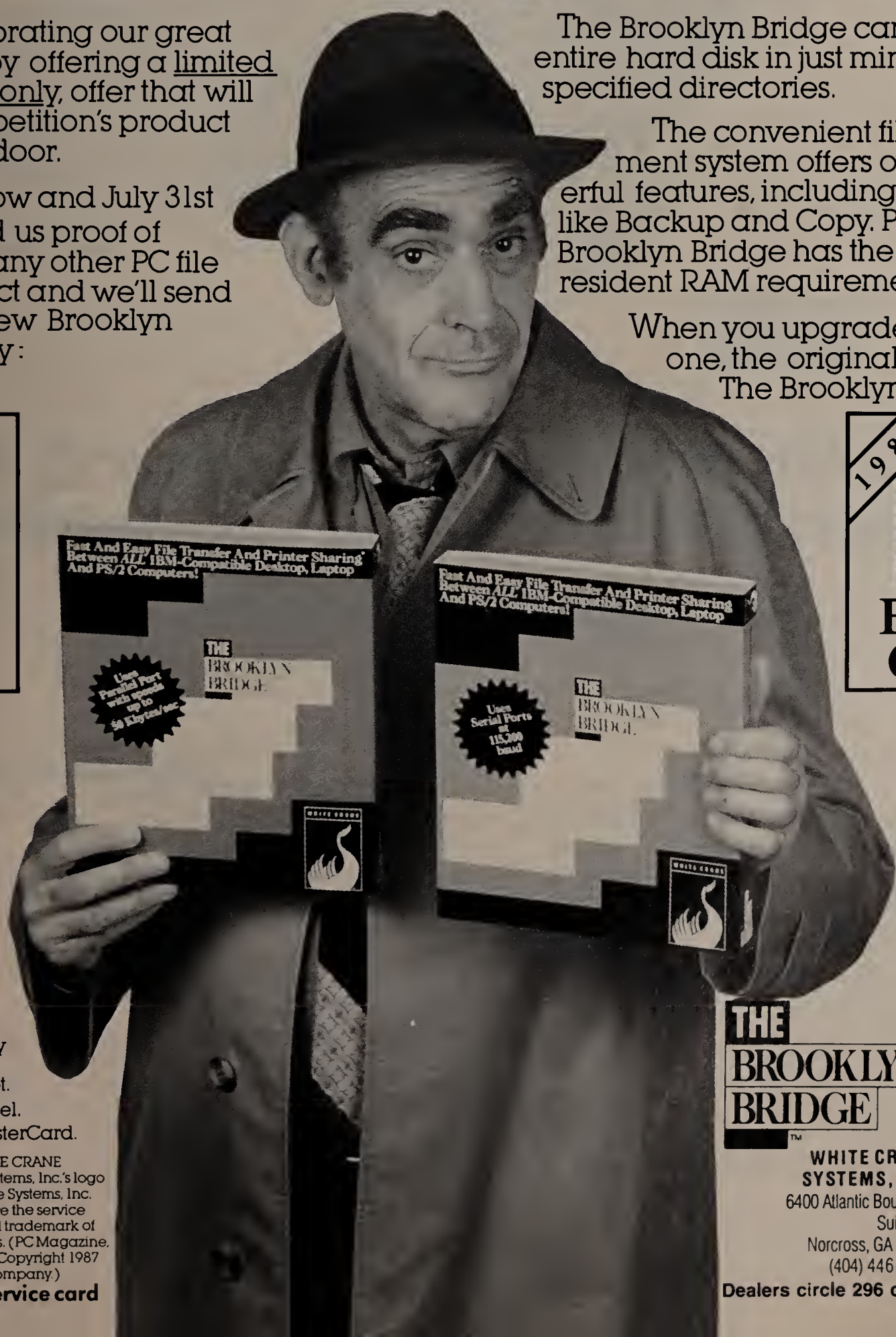

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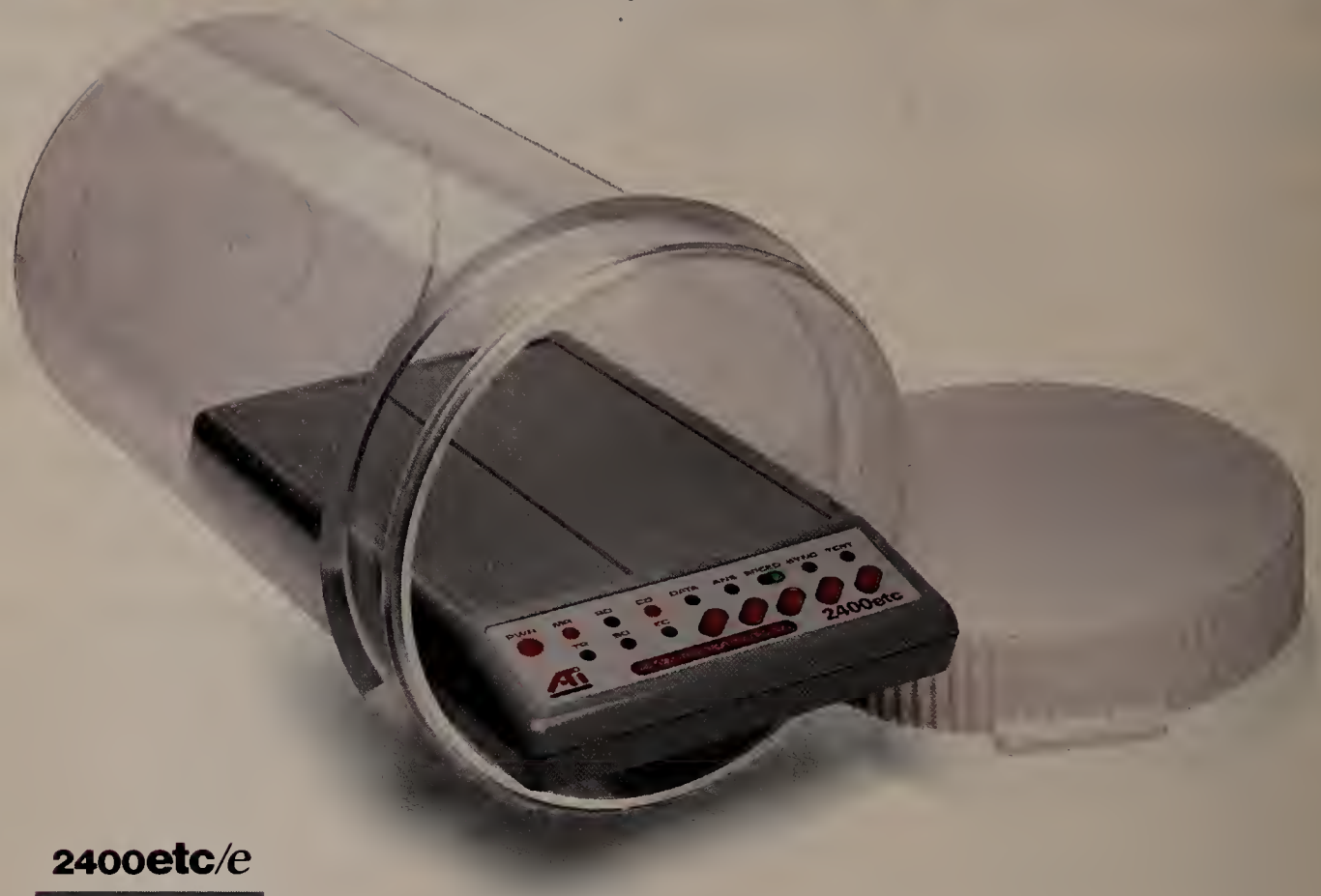

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IBM Debuts Portable, SX

Rebate Program Aims to Spark OS/2 Sales

IBM has finally entered two of this year's hottest PC arenas, launching a high-end portable and a desktop 80386SX machine that incorporate the Micro Channel Architecture bus. Billed as a no-compromise machine for traveling professionals, the 21-pound PS/2 Model P70 386 features a 20-MHz 80386 processor, 4MB of memory (expandable to 16MB), a VGA-compatible 10-inch gas plasma screen with 16 gray levels, a full-size 101-key keyboard, a 1.44MB floppy drive, and one 32-bit and one 16-bit MCA slot. The tall, shallow device (12 inches high by 18.3 inches wide by 5 inches deep) costs $7695 with a 60MB, 27ms hard drive and $8295 with a 120MB, 23ms hard drive. A special port lets you plug in an external floppy drive or tape backup without using an expansion slot. The Model 55 SX, aimed at customers standardizing on 386 systems, comes with 2MB of memory (expandable to 16MB), three 16-bit expansion slots, and other familiar PS/2 features such as built-in VGA support. It costs $3895 with a 30MB, 39ms drive and $4295 with a 60MB, 27ms drive. Additionally, IBM unveiled a rebate program for its slow-selling OS/2 system software. Through 1989, customers who buy OS/2 products will get money back when they also purchase IBM memory, add-in cards, disk upgrades, or selected applications from IBM and others. (The memory rebate is $100 per MB.) "We think memory has been the inhibitor for OS/2," explains Winney Briney, IBM personal systems marketing director. "It's time to remove the inhibitor."

New Pascals Duel

Microsoft and Borland Come Out Swinging Object-Oriented Languages at Each Other

Borland and Microsoft introduced new versions of their Pascal programming languages in May, sparking a fierce battle between the two software leaders. Both the steak and the sizzle of Borland's *Turbo Pascal 5.0* and Microsoft's *QuickPascal* is object-oriented programming (see the preview in this issue), which both companies predict will be the foundation of application development in the 1990s. Microsoft plans an all-out attack on the Pascal market, which Language Group Product Manager Stew Chapin acknowledges is owned by Borland. Microsoft is staging an aggressive marketing campaign to convince *Turbo Pascal 4.0* users to upgrade to *QuickPascal* (its first entry-level Quick version) rather than *Turbo Pascal 5.0*. Microsoft will enable computer dealers to sell the $99 product for as little as $49.95; *Turbo Pascal* lists for $149.95 with an upgrade price of $34.95 from *Turbo Pascal 4.0* and $75 from prior versions. "We are totally compatible with *Turbo Pascal 5.0*, and our extensions will feel and look more intuitive to the current Pascal user," asserts Chapin. Microsoft is being pressured by Borland in other language markets but still captures 59 cents of every language dollar spent with dealers, according to market researcher IMS America. However, claims Gene Wang, director of languages product management at Borland, other distribution channels actually give Borland a slight edge. Wang predicts that *Turbo Pascal 5.0* will simply outperform Microsoft's *QuickPascal*.

Leading Edge Rebounds

Supplier Ships Daewoo Computers Again, Cleans Up Service Backlog

Leading Edge has resumed shipments of its Daewoo-made Models D, D2, and D3. And according to resellers, the company is once again meeting its commitments for repair, service, and technical support to customers and some 1600 dealers. "They are making parts available in a manner and in quantities unprecedented under the previous management," observes Alex Peder, manager of Ballard Computer, one of a group of resellers that forced Leading Edge to seek Chapter 11 bankruptcy protection last winter because it didn't meet its product commitments (see *Top of the News*, *PCW*, May 1989). The bankruptcy court has upheld Leading Edge's exclusive North American distribution rights for Daewoo Telecom computers, and the company is receiving all the product it needs, reports John Sullivan, senior vice president of marketing, who returned to the company in April. In fact, Daewoo is financing those shipments and is in the process of taking over Leading Edge, says Sullivan. That will bring the company out of Chapter 11 and resolve some $15 million in debt, most of it to dealers. Currently, all receipts are invested in rebuilding the company, which went from 200 employees to a handful and is now back to 50, says Sullivan. But a lawsuit against former computer supplier Mitsubishi Electric also must be resolved. Leading Edge has an installed base of more than 500,000 Daewoo systems.

Patent Awarded

Quarterdeck Will License Method for Writing to Display

Quarterdeck Office Systems has been awarded a U.S. patent covering a way of displaying windows on screen. The patent could affect other multitasking programs such as Microsoft's *Windows/386*, the principal competitor to the *Desqview* multitasking environment. This spring Quarterdeck, which claims to have shipped more than 1.2 million copies of *Desqview*, received patent number 4,823,108, entitled "An Improved Display System and Memory Architecture and Method for Displaying Images in Windows on a Video Display." Quarterdeck executive vice president Gary Pope describes the technology as a way to make applications write to a "pseudo screen buffer" instead of directly to screen. This enables *Desqview* to display within windows and update "poorly behaved" applications that write to the screen rather than to the system. Among those programs are such current favorites as *1-2-3*, says Pope, who adds that the technology isn't limited to DOS or character-based applications. Quarterdeck, which at press time was studying other programs and considering licensing applications, refuses to indicate which companies might be affected by its patent. Microsoft is examining its exposure. "From what we know, we have absolutely no reason to believe that we have infringed on the patent in any way," says a spokesperson, who declined comment on how *Windows/386* displays windows.

Budget Express Blessed

1-2-3 Add-In Is First to Get Bolstered Marketing Support From Lotus

Lotus Development and Symantec are teaming up to market *Budget Express*, the latter's new add-in for Lotus's *1-2-3* releases 2.0 and 2.2. The $149 program is the first to carry a "Lotus Featured Product" seal and to benefit from extra Lotus marketing support, enthuses Symantec executive vice president Rod Turner. He claims that, unlike add-ins that give *1-2-3* peripheral functionality such as word processing, *Budget Express* provides enhancements to the core functions of budgeting, forecasting, and planning that users buy spreadsheets for in the first place. It expands on *1-2-3*'s columnar hide/unhide command with two-dimensional outlining that can hide the details of rows as well as columns so that users can move between levels of detail in a few keystrokes. Virtual memory management stores unused portions of a worksheet on disk, freeing up memory. A goal-tracking feature lets users adjust expenditures to meet a goal, showing proximity to the target in an on-screen window. Lotus plans "a new level of commitment to future add-ins that significantly enhance basic *1-2-3* functionality," says Associate Product Marketing Manager Jim Richard. "We are taking another step in how we work with third parties and will help some products launch with time, money, and marketing and sales efforts."

Start-Up Challenges Intel

Former Weitek Executives Plan Series of Alternatives to Intel Components

A Santa Clara start-up will begin shipping a series of Intel-compatible components in June that will provide system manufacturer and aftermarket alternatives to the giant chip-maker's products. Integrated Information Technology, founded in April 1987, will release its 2C87 and 3C87 math coprocessors, which it claims are both plug– and object-code–compatible with the Intel coprocessors for 80286- and 80386-based computers, respectively. While prices had not been set at press time, Vice President of Sales and Marketing Gene Parrott indicated that the parts would be priced about the same as Intel's but would have improved overall performance and faster graphics modeling. That combination may gain IIT as much as 15 percent of the market, says Dean McCarron, director of systems research at In-Stat, who reports that the 3C87 runs about twice as fast as its Intel counterpart. Parrott claims that IIT has achieved 100 percent compatibility without reverse engineering or obtaining a license from Intel. "The coprocessors are designed from the ground up without access in any form to Intel documentation, personnel, or architecture." Founded by former Weitek executives, the 21-person company will distribute the coprocessors through mail-order ads, retailers, and system manufacturers. By year-end, IIT also plans to supply board makers with a high-end graphics chip compatible at 1024 by 768 with IBM's 8514/A hardware and application interface. It also will be backwardly compatible with the VGA Plus, VGA, EGA, CGA, MDA, and Hercules standards. ●

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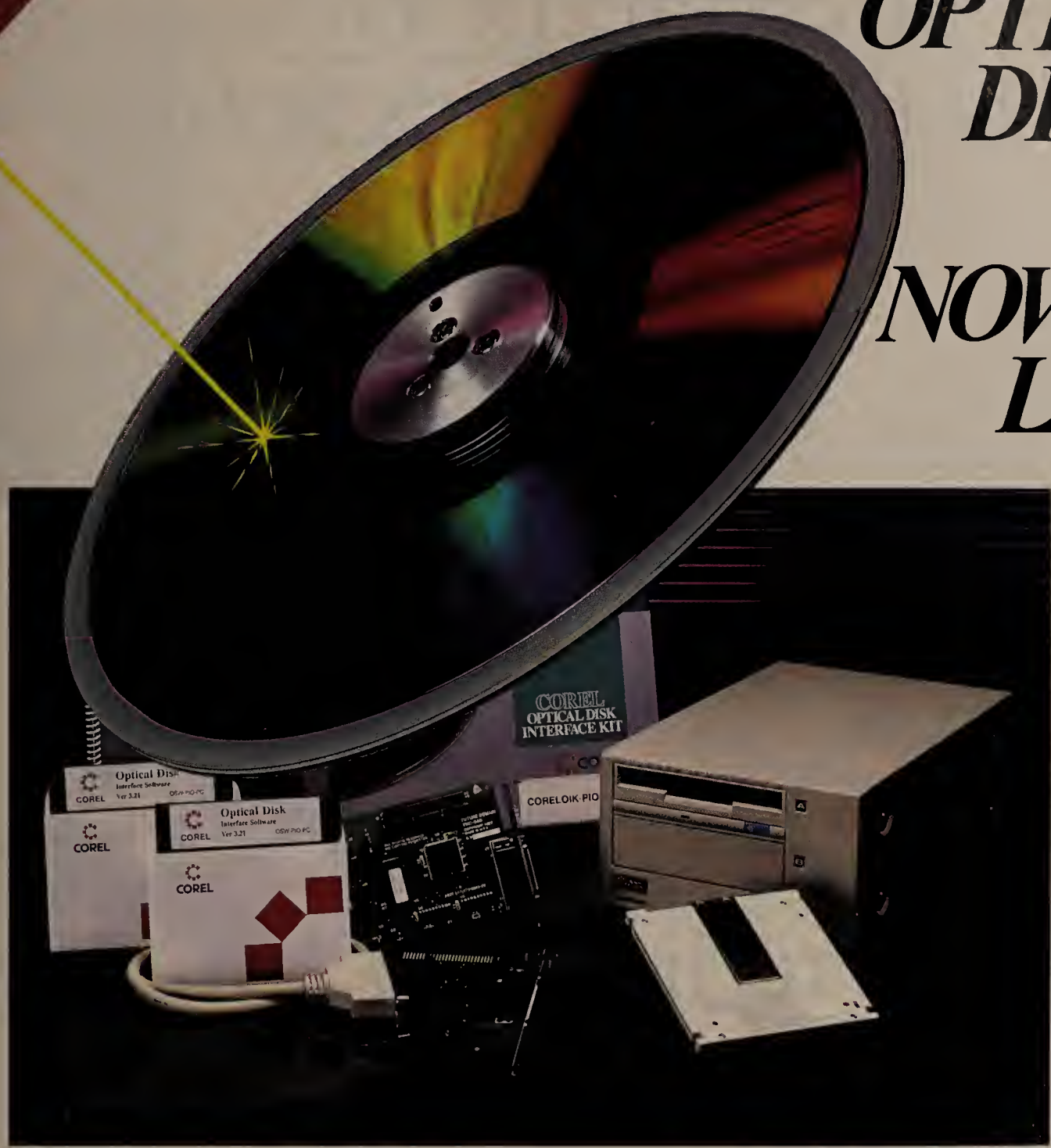

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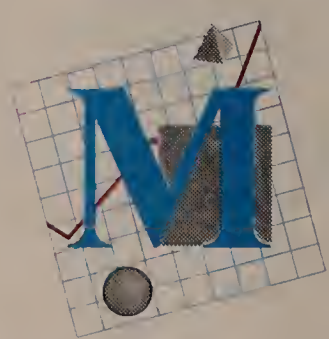

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No Small Potatoes

Software developers should design their programs for the most demanding audience of all— small-business users.

Old myths die hard. While small businesses crank away at the low end of the technology curve, adopting computer solutions that are nearly obsolete, big businesses aggressively seek out the latest and greatest in next-generation products—sometimes even before their time. New technology represents such a boon to big businesses that they willingly suffer the added cost and effort needed to support it. Meanwhile, penny-pinching small businesses can't afford to take the chance that high tech will pay off, so they don't. Or so we say.

The truth, of course, belies the clichés. According to a recent survey conducted by the MIS publication *Datamation*, an astounding 64 percent of PCs in surveyed companies with 50 or fewer employees were connected by a LAN, compared to 32 percent in companies with 5000 or more employees. Similarly, in a recent *PC World* study, 41 percent of all readers who used 386-based systems worked in companies with 100 or fewer employees, compared to only 25 percent in the largest organizations—those with 5000 or more workers.

Despite such evidence, software developers continue to think of big business as the proving ground for new, sophisticated applications that extend the power of personal computing. It's not hard to understand why. Software firms like to believe that their fortunes lie in huge volume sales to Fortune 500 companies. These firms presumably have both the business motivation to adopt complex new programs and the centralized technical services needed to support them.

Yet in big business this pattern of buying and using personal computer technology is inexorably withering away. Corporate decentralization means that more and more business units are now in charge of managing their own PC budgets. MIS is under fire as frontline managers try to bring training and support costs into line. In many big businesses, PC purchase patterns now match those of small business.

As the numbers above also suggest, small companies are proving quicker to adopt high-tech solutions than their big-business counterparts. While most large corporations wrestle with the dilemma of moving forward while burdened by an accumulation of incompatible hardware and applications, small businesses can start with a clean slate, free to consider new technology as a way to level the competitive playing field.

That makes small businesses more daring in their use of new products but also more demanding. Without the support of full-time MIS staffs, managers in small companies expect applications to be simple to install, use, and maintain, while being powerful and easy to extend as the business grows—all at the same time. There's no more challenging problem for software developers. Small business has become a red-hot crucible to test the best ideas the computer industry can muster.

Some smart companies are finally getting the message. Take Novell, for example. With most of its sales going into sites without a full-time MIS director, the company must have realized it was extremely vulnerable to a competitor that could smooth out the problems of day-to-day LAN use. So Novell's next-generation LAN operating system, *NetWare*

(continues)

FILL IN ANY FORM QUICKLY AND EASILY ON YOUR PC.

FormFiller 2.0. The Complete Form Fill-In System.

Consider all of the existing forms that you're required to fill out—airbills, government forms, insurance claim forms, invoices, purchase orders and others—how do you accurately, quickly, professionally—and above all, ***easily*** fill in these existing forms?

The answer is FormFiller Version 2—*the* complete system for filling in forms on any PC and printer—*in just minutes!*

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FormFiller will fill in absolutely any form, regardless of its complexity (even double-sided and multi-page forms!). It also includes an innovative system that allows pinpoint-precise spacing for any position on the form— and provides *over 40 financial and math functions* for use *within the form.*

And FormFiller now supports virtually ANY printer—including the new *HP LaserJet Series IID* Duplex printer and many others.

New Import/Export Features.

Version 2 has sleek new import capabilities including dBASE II, III, and Lotus 1-2-3—so you can swap data with virtually any application, eliminating re-entry of data.

Easier Than Ever To Use!

Save hundreds of hours of labor filling in forms. Simply insert your form into any dot-matrix or laser printer and envoke the "print grid" command. FormFiller will actually print numbered horizontal and vertical lines right on the form. You simply enter the coordinates for each blank on the form into the computer. From these, the system creates a "master template" of the form. *Now, the computer and the printer are completely synchronized!* This master template (with a work area of 190 columns by 240 rows) is then displayed on the screen—so you fill in by *tabbing directly from blank to blank!*

Store your form templates for easy call-up and fill-in anytime. FormFiller will even *look up pieces of information and automatically fill them in for you* (i.e. part numbers, addresses, retail/wholesale prices, etc.).

Powerful Math Functions.

FormFiller has spreadsheet-like math capabilities that will perform complex financial/trig functions within forms. Functions available include *internal rate of return, net present and future value, straight-line depreciation, principal payment amount, mortgage payment amount* and over 30 more! So you could, for example, tell FormFiller to add the numbers in specified fields, deduct a specified discount, and print the total in position on the form—automatically!

SPECIAL OFFER!

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A special version of FormFiller that includes the Federal Express Airbill template. Now just **$5.00**

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PC WORLD—JULY

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Available on 5¼ or 3½ inch diskettes. Runs on IBM PC, XT, AT, PS/2 or compatibles with 512K. VISA, MasterCard and AMEX. Add $4.50 for shipping. Florida residents add 6 percent sales tax. International orders add $10.00. Include street address—no P.O. boxes.

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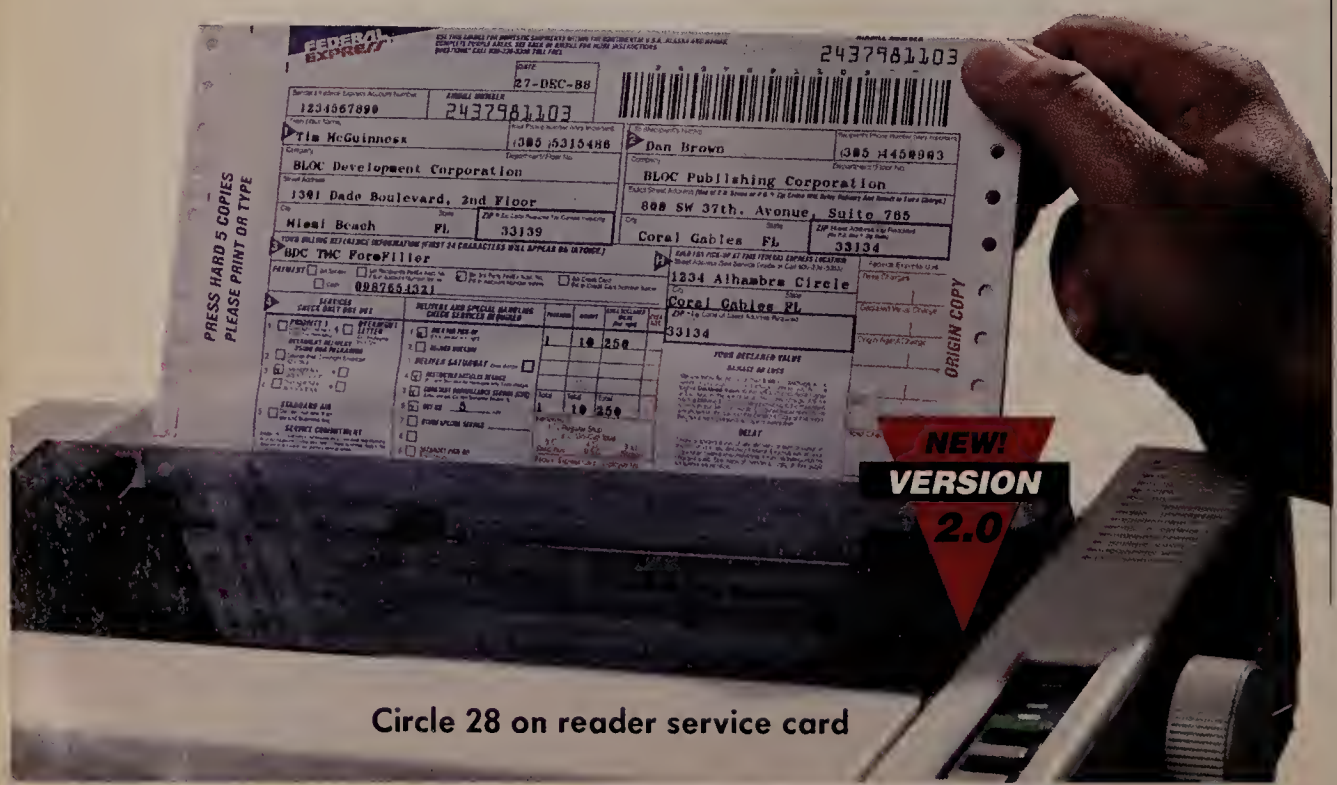

Circle 28 on reader service card

386, is full of utilities that make it easier to maintain a network and extend it on a piecemeal basis. These improvements will prove attractive to small and big businesses alike.

By designing programs that effectively meet the needs of small-business users, developers aim at the highest standards possible in the industry as a whole: software that makes no compromise between power and ease of use, offers easy installation and maintenance, comes with clear documentation and useful tutorials, and provides a worry-free growth path. Right now, we're still pretty far from that ideal. Let's hope we get there soon.

As always, I'm interested in your opinions on this or any other subject. Write to me at *PC World*, 501 Second St., San Francisco, CA 94107; fax 415/442-1891; MCI Mail Richard Landry/301-3685. ●

POWER TIP NO. 56

Easy Edits for 1-2-3 File Names

If you've ever hit the cursor keys in order to edit a 1-2-3 file name or path after you've used the /File Save command, you've encountered the ignominious 1-2-3 beep. Next time, press <Space> and <Backspace>. You can then move the cursor to any part of the file name or path.

Chool Poh Toong
Kuala Lumpur, Malaysia

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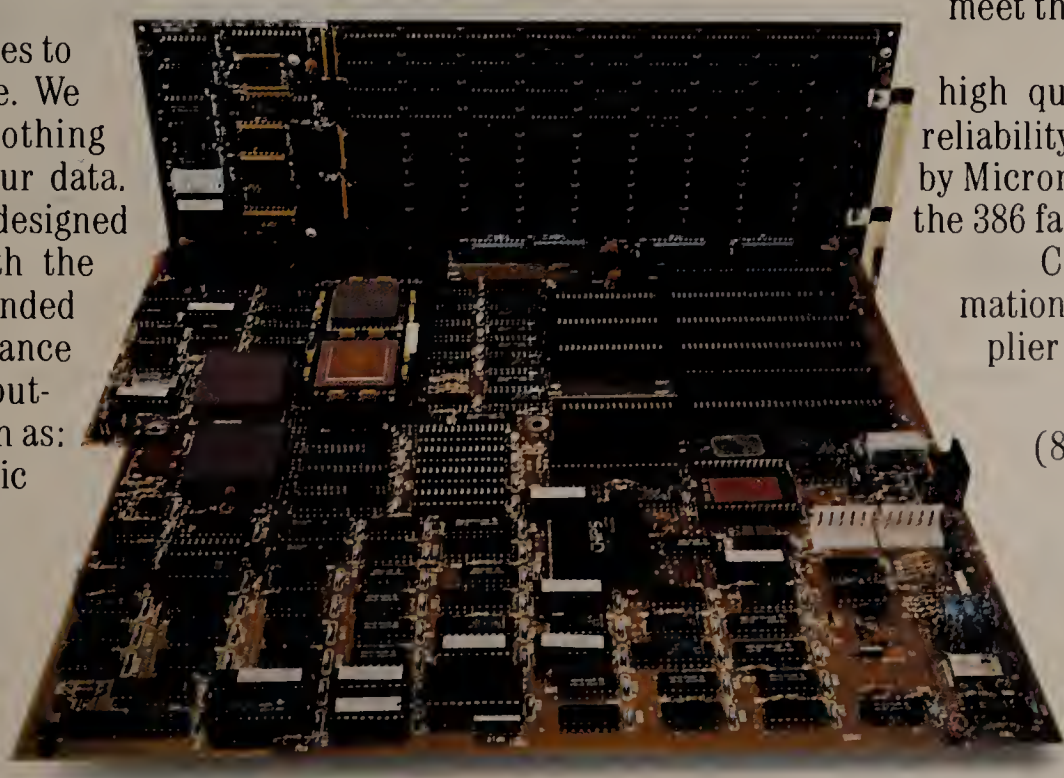
Just Being Fast Isn't Good Enough...

Micronics 25 MHz and 33 MHz motherboards allow you to maneuver in the 386 fast lane!

Some manufacturers push components and designs to improve performance and reduce their costs. Pushing components, even a little bit, creates the kind of heat and stress that cause systems to crash and data to be lost forever.

Micronics refuses to give in to this practice. We recognize there is nothing more valuable than your data. Our motherboards are designed and manufactured with the kind of reliability demanded by todays' high performance computers. These computers require devices such as: cache memory, fast static RAM and coprocessors originally used only in mainframes. Advanced operating systems including UNIX and OS/2 require high levels of design sophistication. Large databases, spreadsheets and multiuser applications also have complex critical timing requirements. Micronics motherboards are built to meet these needs.



Advanced engineering, high quality, and unequalled reliability: motherboards created by Micronics to help keep you in the 386 fast lane!

Call now for more information and the Micronics supplier nearest you.

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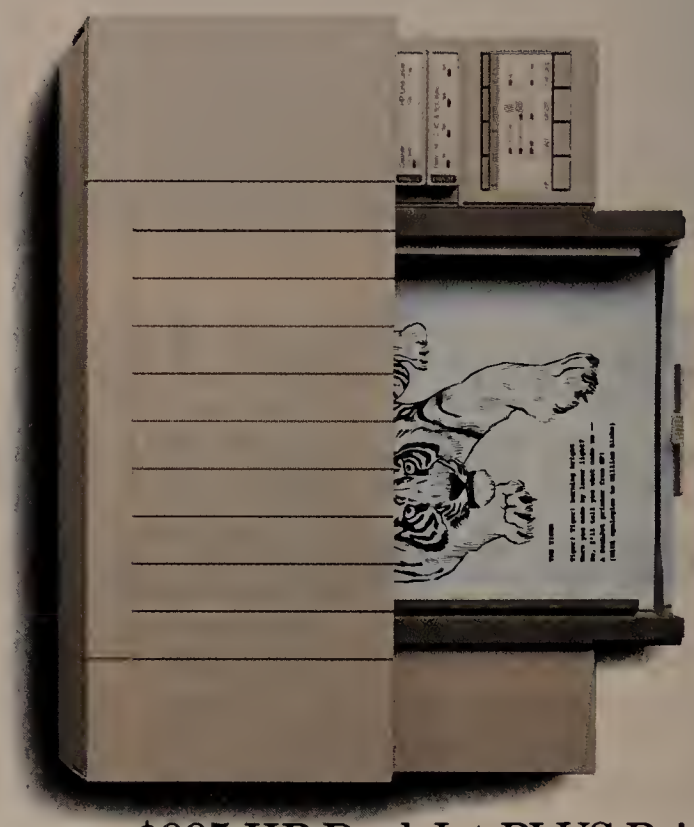
Fully Utilizing the Power of the 386.

935 Benecia Avenue, Sunnyvale, California 94086

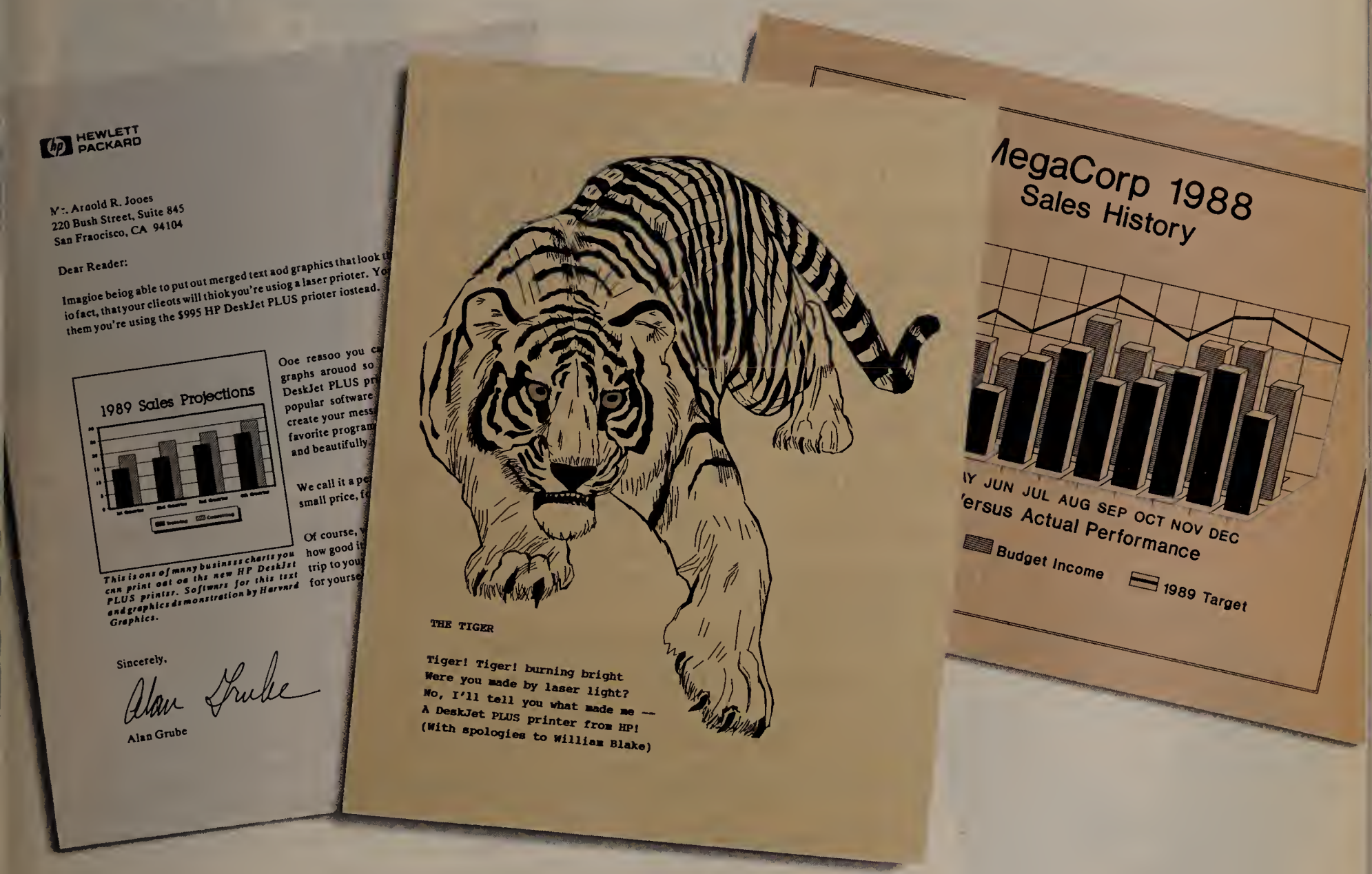
Circle 198 on reader service card

We keep telling people this is <u>not</u> a laser printer.



The new $995 HP DeskJet PLUS Printer.

But they keep looking at the evidence.



You won't believe your eyes (or ears), either. The HP DeskJet PLUS printer gives you the same crisp, black lettering. Clean, sharp graphics. And whisper-quiet operation. But it uses advanced inkjet technology to supply these laser-like qualities for the price of a 24-wire printer.

For just $995, you get 300 dpi in a trim 15-pound package that's twice as fast as the original. What's more, it has built-in landscape and improved font selection. Including ten built-in fonts and over 100 optional fonts, with sizes up to 30 points. And its 20,000-hour MTBF assures a long, happy life.

So call **1-800-752-0900, Ext. 276J** for the name of your nearest authorized HP dealer. Then judge the HP DeskJet PLUS printer for yourself.

HEWLETT PACKARD

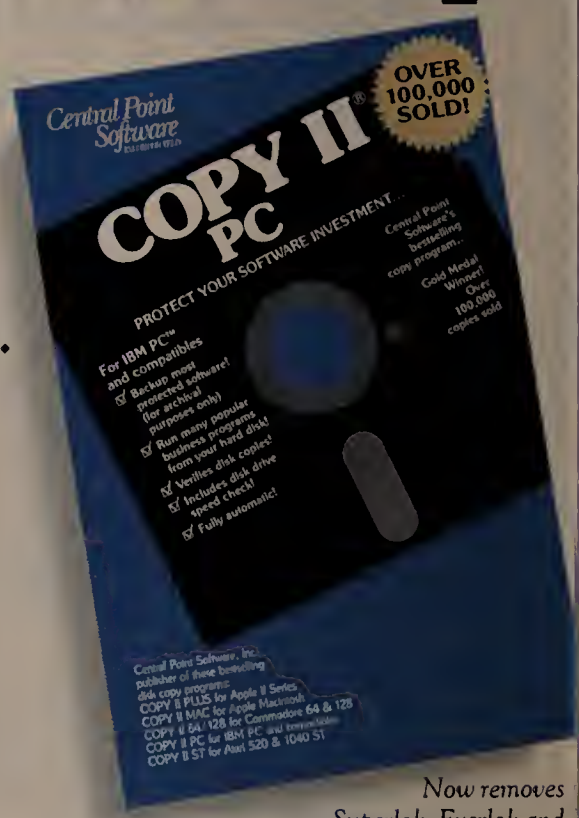
Documents created using Wordperfect 5.0 and Harvard Graphics software. ©1989 Hewlett-Packard Company PE12912

Circle 58 on reader service card

No Matter How It's Protected, Be Sure You Can Back It Up.

Several products can back up protected software. But only two are tough enough to handle even the trickiest protection schemes.

Copy II PC,® for just **$39.95,** backs up more protected software than any other program. What's more, it can remove copy protection already on your hard disk. *PC Magazine* calls it the "easiest of such programs to use." And now, with our menu-driven Noguard, it's a snap. Copy II PC easily handles Lotus 1-2-3 and over 100 other top-selling programs.



Now removes Superlok, Everlok and Prolok copy protections.

For the ultimate solution, try the **Copy II PC Deluxe Option Board.** For just **$159,** it gives you the same advanced technology used by commercial disk duplication firms.

PC Magazine reported it "could not find a program this board couldn't handle." It's so powerful, in fact, it even lets you read and write Mac data files in a IBM PS/2 Model 25 or 30, or a PC or AT with a 3.5″ internal drive.

No matter how it's protected, be sure you can back it up. **For the dealer nearest you, or to order direct, call (503) 690-8090,** M-F, 8 a.m. to 5 p.m. (West Coast time).

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LETTERS

Reactions and responses from the PC World community

Trust the User

The world is a better place the more it is based on trust. That's why I avoid copy protected software. Why would anyone want to pay a supplier whose interests are best served by making our work more difficult? Likewise I avoid computer products that are rigorously defended against competitors, like those in the big-power lawsuits you have been covering recently ["dBASE Users: Don't Take It!" *Another Angle, PCW,* April 1989]. The marketplace offers plenty of good products made by companies eager to cooperate with their customers, not exploit them and the competition. Why buy anywhere else?

Peter Morris
Houston, Texas

Pick a Card, Any Card

Brian Livingston's article "Let There Be Standards" [*Another Angle, PCW,* March 1989] prompts me to offer a different slant on the theme. Hardware vendors would have us believe that businesses are hotbeds of card swappers feverishly moving components from one computer to another. They liken PC standards to the standards in the automobile industry. Tell me, when was the last time you tried to fit a General Motors oil filter into a Porsche? Cookie-cutter sameness and component swapping are less important than the overall quality of the computer you buy, which should be designed and built to last—and, of course, to accept a reasonable number of enhancement parts.

Tom Smith
Fort Vancouver, Washington

Take My PS/2, Please

I just read the letter "Why Not a PS/2?" from Peter H. Strong [*Letters, PCW,* March 1989]. We have 12 PS/2s in our small department—6 Model 30s, 3 Model 50s, a Model 50Z, and 2 Model 60s. We have had five major problems in less than a year. Our 3 XT and AT clones have had nary a problem in more than two years. The contention that "MCA-equipped PS/2s are twice as reliable as other PCs and cost half as much to maintain" is just another example of IBM's marketing hype. My experience suggests that PS/2s are half as reliable and cost twice as much to maintain.

Robert Solomon, M.D.
Mt. Sinai Medical Center
New York, New York

Overhead or Overkill?

I just finished reading your preview of *SideKick for Presentation Manager* [*PCW,* March 1989]. Did I read it right—3MB of RAM and 2MB of hard disk space to run *SideKick?* They've got to be kidding. What we have here isn't progress but the proverbial white elephant. If we extend this to the absurd—where it belongs—in a couple of years I'll need 10MB of RAM and maybe two hard disks just to sit down and write a letter. Not that the letter would look any better, but I could say I was using the latest operating system and all my system overhead.

Demetrio Lamzaki
San Francisco, California

The Great Laptop Weigh-In

The reviewer of the Mitsubishi MP 286L laptop [*The Hardware Shelf, PCW,* February 1989] stated that at 17 pounds, it was about 2 pounds lighter than the Zenith SupersPort 286. The Zenith laptop may have gone on a feeding frenzy, but I purchased

(continues)

ANTHONY RUSSO

If you want better word processing, don't settle for Perfect.

The trouble with WordPerfect® is, sometimes it isn't. Not when you compare it to our new Microsoft® Word version 5.0. Not when you consider that with Word 5.0, you'll pump out your day-to-day jobs quicker, easier, even smarter than you ever thought possible. On your IBM® PC or 100% compatible. It doesn't get much simpler than this.

Introducing new Microsoft Word 5.0. When Perfect just isn't good enough.

Example: With Word 5.0 you can choose commands by either using simple speed keys or just selecting from a menu.

You can tab, delete, italicize, move, change font and size, even cut and paste with about 50% fewer keystrokes than you-know-who.

Your workgroup can even make any annotations right on a document, then you can merge and collect all the comments. WordPerfect? No comment.

You can also sort, list, search and archive files across multiple directories, on your PC or across a network, thanks to the Word 5.0 document management and retrieval system.

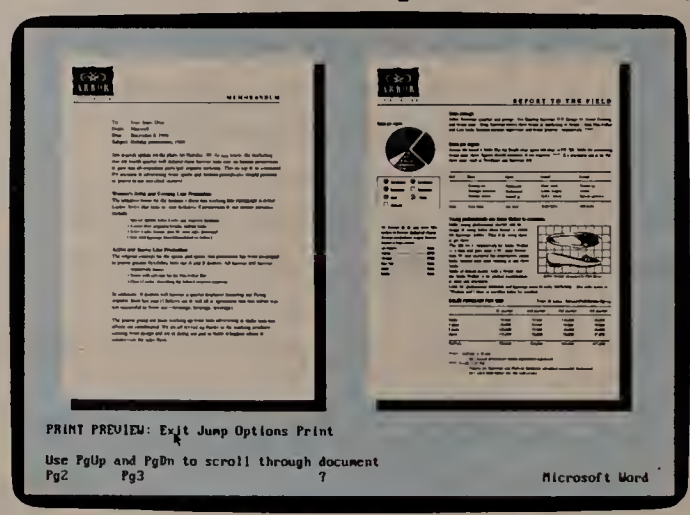
Or incorporate part, or all of a Lotus® 1-2-3,® Microsoft Excel or Microsoft Works spreadsheet into a Word document. And then update it. In seconds.

All of which is reason enough to try new Word 5.0. But for those who need a little more

COMMON WORDPROCESSING TASKS

Which requires fewer keystrokes?	Microsoft Word 5.0	Word-Perfect 5.0
Copy Block	4	7
Delete Line	2	4
Italicize Word	2	5
Change Font and Size	6	9
Add Footer	1	7
Box Paragraph	5	12
Total	20	44

With new Word 5.0 you'll do about 50% less hunting and pecking than with WordPerfect.



Word 5.0 Print Preview makes sure what you see is what you want. Before you print it.

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ARBOR
FOOTWEAR

REPORT TO THE FIELD

Sales per region

Northwest · Southwest · Northeast · Southeast · East · West · Midwest

The following are the most recent Telex numbers for the Arbor regional sales offices. All client and distributor inquiries should be directed to these numbers.

Los Angeles	06785
Atlanta	05786
Chicago	07658
New York	08657
Miami	05876
Detroit	08875

Shoe enough

Arbor Footwear comings and goings: Jim Dearing becomes V.P. Design for Arbor Evening and Dress wear. Greg Vroonas moves from Peoria to marketing in Miami. Joan MacArthur and Lisa Doan become account supervisor and media planner, respectively.[1 Ridgley C.]

Sales per region

Across the board it looks like the South once again led sales in FY '88. With the continuing pump craze those figures should maintain, if not improve.[2 Jim W.] It's important not to let the other areas such as Northeast and Midwest fall.

Style:	Dress	Sport	Career	Casual
	Evening eel	Weekender	Tailor made	Trouser tip
	Midnight moccasin	Kickaround	Ladies wingtip	Loafer
	Twilight toeless	Runner up	M.B.A.-bound	Special spectator
Price:	$150-$350	$85-$125	$120-$250	$90-$150

Young professionals use Arbor Walker to commute.

Soon, young professional women will no longer be using Arbor shoes simply to climb the corporate ladder. They'll be using them to get there.

This fall we're introducing the Arbor Walker — a shoe that goes quite a few steps further than the now-accepted but unattractive tennis shoes women have been wearing to and from work.

Made of Italian leather with a rubber sole, the Arbor Walker is the perfect combination of style and durability.

Arbor Walker designed by Pier Basto.

Look for promotional materials and carrying cases in early September. Our sales point is: "Women don't have to sacrifice looks for comfort."

SALES FORECAST FOR 1989 Types of shoes: Summer/Fall/Holiday/Spring

	1st quarter	*2nd quarter*	*3rd quarter*	*4th quarter*
Dress	95,000	87,000	120,000	60,000
Career	40,000	82,000	60,000	90,000
Casual	120,000	85,000	75,000	80,000
Sport	135,000	60,000	90,000	87,000
TOTAL:	390,000	314,000	345,000	317,000

[1 Ridgley C.] *9/27/88, 4:32 PM*
let's discuss forecast for media department expansion.
[2 Jim W.] *7/1/88, 1:15 PM*
Figures for Northeast and Midwest should be calculated separately mid-month
let's catch them before they fall with promo.

Text, graphics, fonts, annotations. Faster, simpler, cleaner. Compliments of new Microsoft Word 5.0.

convincing, picture this: Outline View. When creating longer documents, Outline View lets you switch to a view of headings only. Which means you can see the structure of your entire document, and rearrange it just by rearranging your headings.

★★★★	8.4	Microsoft Word
★★★★	8.1	WordPerfect

Software Digest recently chose the best overall advanced word processor on the market. Who won? In a word, Word.

We could go on and on with more advantages. But your best bet is to call for a convincing demo at: (800) 541-1261, Dept. J13. After you call us, try calling WordPerfect for a demo. Run both, our Word against theirs, head to head, and then ask yourself:

Which one brings your word processing closer to perfection?

Microsoft®

Making it all make sense.

and 1-2-3 are registered trademarks of Lotus Development Corporation. WordPerfect is a registered trademark of WordPerfect Corporation. Customers in Canada, call (416) 673-7638. Outside North America, call (206) 882-8661. Software Digest rating from April 1989 issue. This offer valid only in the 50 United States.

one last year, and it weighed 10.5 pounds, 14.5 pounds with the battery pack. The Zenith weighs in 2.5 pounds lighter—quite a difference!

Doug Neumann
Kansas City, Missouri

The SupersPort 286 we weighed hadn't gained excess inches around the waist, just a battery charger. We defined the traveling weight of battery-powered PCs as the combined weights of the laptop itself, its battery pack, and the charger. —Ed.

3½ INCH 1.4 MB DISKS FOR ONLY ONE DOLLAR!

New Invention Makes It Possible!

Do you use the new, high capacity, 3½ inch disks? If so, you have paid four, five, even six dollars per disk! Byte for byte, that is as much as SIX TIMES the 'old' 360K floppies. Now you can convert all your programs, data, and files to the new format, WITHOUT PAYING THESE PRICES!

HOW IS THIS POSSIBLE? Have you ever tried to format a regular, 'low density' 3½ inch disk to 1.44 MB? Of course you have! It doesn't work! The computer gives an invalid media error. Our company was putting in a large network of IBM Clones. We have grown from a small company to a million-dollar corporation in two short years, and we didn't do it by wasting money. So, of course, we tried to use the cheap, 720K disks. Total failure.

ENTER OUR CRACKPOT ENGINEER. Our Crackpot Engineer wondered what was the difference between the disks. He tore them apart, analyzed the media. He found NO DIFFERENCE WHATSOEVER! Yet, they would not format. Why? Then he started examining the plastic housing. And he found the difference. It is NOT in the media, IT IS IN THE PLASTIC CASE!

TOTAL FAILURE! Our Crackpot Engineer (among other things, he invented the Electronic Flea Collar) sent a brand-new 720K disk to our machine shop, and asked them to modify it. They did... and the DISK IMMEDIATELY FORMATTED! But, within 10 minutes of use, it totally failed. It lost data all over the place. Back to the drawing board. The disk was dis-assembled and examined. It was found that, in performing the conversion, a microscopic piece of plastic had entered the housing, and total , ,uined the disk. It was obvious that, if the conversion could be done reliably, it required extreme precision.

ENTER OUR OTHER CRACKPOT ENGINEER. Our president is a mechanical engineer. One of the best in the country. While a research scientist at Colorado School of Mines, he completely revolutionized the field of water jet drilling. He tackled the problem. Finally he came up with a solution - a precision tool which could perform the modification EVERY TIME and leave no plastic particles which would damage the disk!

MONTHS OF TESTING. We then commenced on a testing program. We modified and formatted thousands of disks, and tested them for data integrity. Out of one thousand disks, one would not format, two had one bad track. NOT ONE LOST ANY DATA! We then put a disk on a computer with a bat file which copied data to a disk, read and checked every byte, then copied the data back to the disk. The program ran 24 hours a day, for TWO SOLID WEEKS without even one error! We were finally convinced that the procedure was reliable enough for a product.

OUR OFFER. Here is our irresistible offer. Purchase our DoubleDisk Converter for the price of $39.95. If you are not COMPLETELY SATISFIED, return the DoubleDisk. You will receive a FULL REFUND! What is more, if a disk ever does not convert properly, send us the disk, and we will send you a 1.44MB disk from a major manufacturer in exchange!

YOU CAN'T LOSE! You will save MORE THAN THE PURCHASE PRICE IN CONVERTING ONLY YOUR FIRST TEN DISKS! from that point on, it is all profit. After converting only 100 disks, and after deducting the cost of the DoubleDisk, you will have saved AT LEAST $425.00! Quite a return for an investment of only $39.95!

CREDIT CARDS AND CHECKS ACCEPTED! Purchasing our DoubleDisk is easy! Simply call our 800 number. We accept all major credit cards. Or, return the coupon below, and we will ship you one immediately. We Will gladly accept your personal check.

24 HOURS **ORDER TOLL FREE — 1-800-537-4226** 7 DAYS

(In Colorado call 303-872-8945)

YES! I want to try your DoubleDisk on your UNCONDITIONAL MONEY BACK GUARANTEE! I enclose only $39.95 plus $3.50 Shipping and Handling (California residents add $2.40 Sales Tax) for each DoubleDisk Converter. If I am not COMPLETELY SATISFIED, I will return the DoubleDisk for a FULL REFUND! If any disk ever fails to convert, I will send it to you and you will IMMEDIATELY send me a 1.44MB Disk in exchange!

Name _____ Address _____

City _____ State _____ Zip _____ Telephone _____

Send To: Biological Engineering, Inc., DoubleDisk Offer
2674 Main Street, Ventura, CA 93003 Phone 805-644-1797

Circle 30 on reader service card

Payroll Booster

Your article "Hot Picks in Small Business Accounting" [*PCW*, March 1989] was most interesting. However, I do not understand why the payroll module was not considered important. Even with a small staff of six, I find my payroll module invaluable in calculating and posting deductions and employer payments.

Rev. Donald White
Temiscaming, Quebec

Granted, payroll and other features we noted briefly, such as inventory, are important to many small businesses. For comparing the products on review, however, we chose to examine the three crucial elements of business accounting systems: general ledger, accounts receivable, and accounts payable. —Ed.

Do You Love Your Mouse?

"PageMaker Speedup Tips" [*Tips and Techniques, PCW*, March 1989] finally legitimizes my argument that the mouse is a slow and inefficient device for selecting functions. Most mouse aficionados seem to be emotionally wedded to its alluring image of sophistication and bravura. Keyboard functions are invariably faster than engaging functions with a mouse, which requires painstaking precision.

Acceptance of *Windows* also seems to be driven by emotional concerns more than by practical ones. While the displays are certainly beguiling, the amount of memory and time required to generate the screens is appalling. Even worse is the rush of

(continues)

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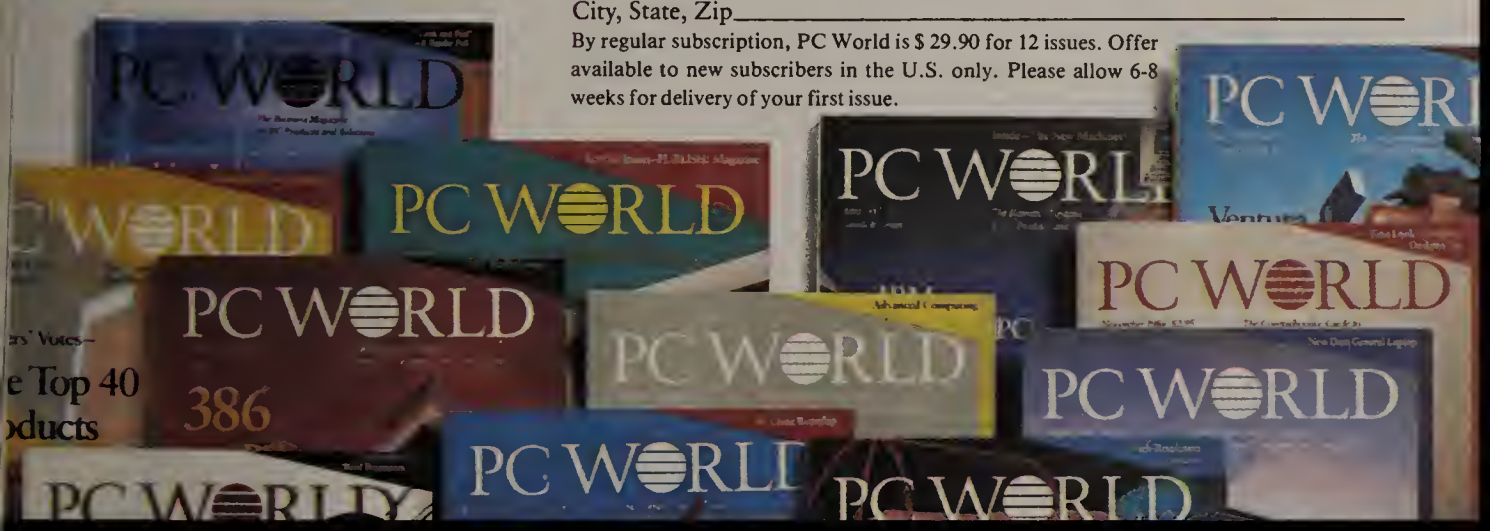

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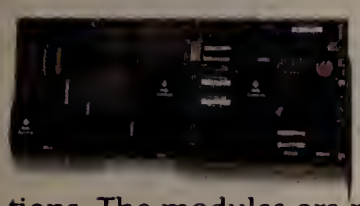

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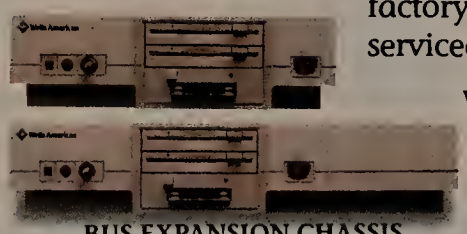
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Wells American Corporation 1989

Circle 216 on reader service card

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Today's manager has to juggle dozens of different tasks. But dealing with the ins and outs of different software packages shouldn't have to be one of them.

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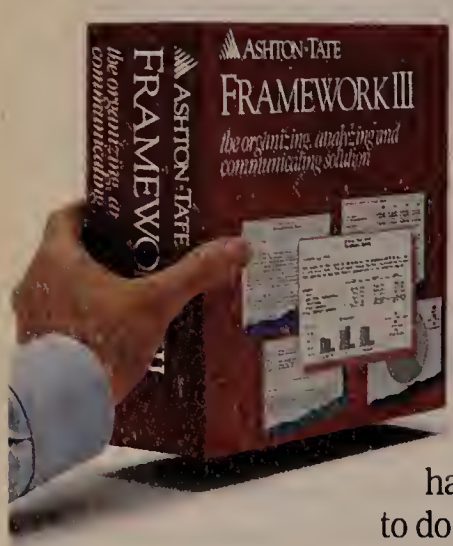
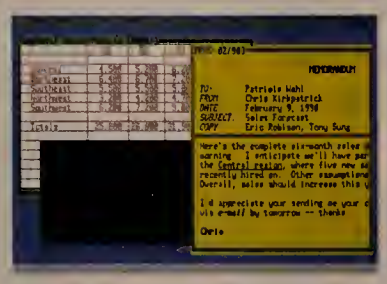


That means you'll always have easy access to all your information. Because you always use the same, easy-to-learn interface—no matter what the task at hand. Or how many tasks you have to do at the same time.



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For example, you can interrupt word processing to log on to a mainframe; get needed data; jump into a spreadsheet; use the data to create a graph; and insert it into your document. Without ever leaving the program. It's that simple.

It's just as easy to transfer files between Framework and other programs, like Lotus 1-2-3® and WordPerfect.® Or use its telecommunications module to access files from other computers or link up to remote databases.

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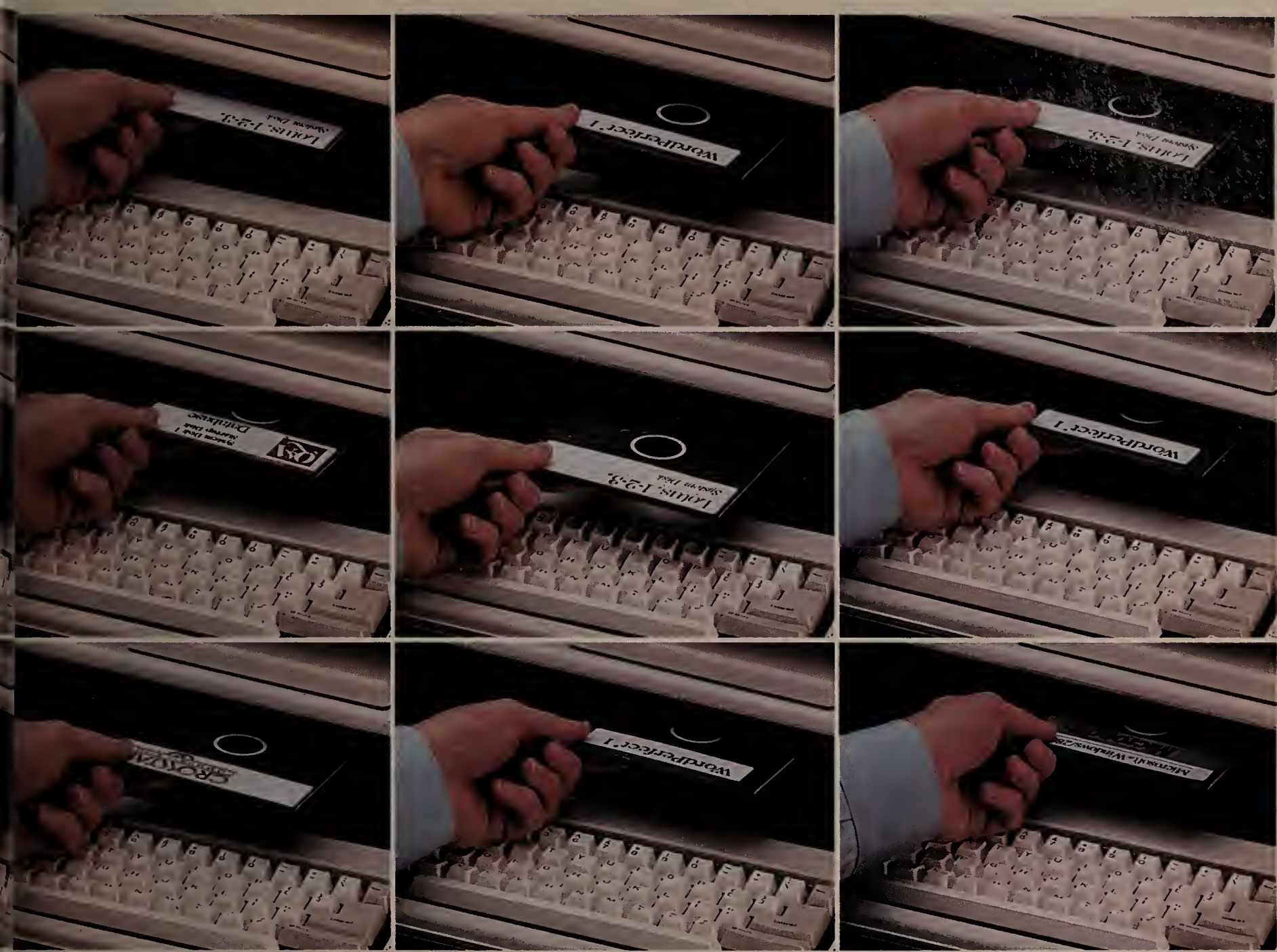

other software packages.

Would you rather carry around six programs or one?

merging into form letters.

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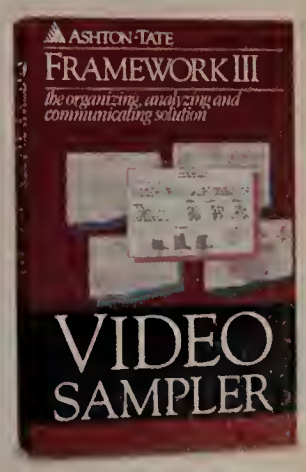

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MULTIPLE MENU STYLES
Organize your menus and menu items in any manner you wish. Choose from 5 menu styles for each menu or customize your own screen using the boxing style. Display up to 39 items on a single screen.

SINGLE KEY MANEUVERABILITY
Menu items are selected by highlighting an item or entering a number. Randomly maneuver from menu to menu by pressing a single function key.

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Expand file descriptions to 30 characters. Save the commands and paths of each menu item and execute them with a single key stroke. The unique design of this system eliminates the need for training in dos.

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Initial logon password protection controls access to all programs. Access levels are assigned to users, menus and menu items to protect sensitive data. This procedure allows time sharing and networking management.

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Uses a configuration utility that saves the commands and paths of each menu item making the customization of your menu an easy task. Add, change or remove menus and menu items, control password protection, protect data files, setup user IDs and passwords and establish access levels.

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4) PAYROLL
5)

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12) RESEARCH & DEVELOPMENT
13) PRODUCT MARKETING
14)
15)

WORD PROCESSING
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software developers to jump on the *Windows* bandwagon, forcing users into a more elaborate and expensive structure than most applications warrant.

Louis F. Mueller
Tallahassee, Florida

How to Redesign a Data Base

The example of an alumni data base in "How to Design a Data Base File" [*Tips and Techniques, PCW,* March 1989] shows poor planning. The fields should be in logical order of their frequency of use. Most likely you'll be sorting by last name, then by first. You'd want to know the donation nearly as often as the individual's name. A title field should be included if your efforts to appeal to an individual are serious. "The Honorable" doesn't want to be addressed simply as "Mr."

The alumnus's income, as shown, is a junk field. Ranges of income—below $20,000, $20,000–$30,000, and so forth—would be better for sorting. One final caveat: Provide security if private data such as salaries is to be collected. Train staff to respect the sensitive nature of all data elements.

Patricia M. G. Emerson
Sacramento, California

Beware of Flushot4

Thanks to Mary Dolce for her mention of our *Flushot* product [*Another Angle, PCW,* February 1989]. However, your readers should know that the program called *Flushot4* is a trojan program that eats data instead of protecting it. The current version of our product is *Flushot+* version 1.51. It's available for $14 directly from us at 594 3rd Ave., New York, NY 10016, 212/889-6431, from our BBS at 212/889-6438, and from IBMNET on CompuServe.

Ross Greenberg
President
Software Concepts Design
New York, New York

Corrections and Clarifications

Shortly after Alan Southerton's review of Logitech's ScanMan bewailed its limited 200-dpi resolution (*The Hardware Shelf, PCW,* February 1989), Logitech introduced an upgraded version with 100-to-400-dpi resolution.

The review of *Turbo Pascal 5.0* (*The Software Shelf, PCW,* March 1989) should have stated that the utility *Turbo-Plus 5.0* comes from Nostradamus, Inc., in Salt Lake City, Utah. *PC World* regrets the error.

To send correspondence, please see How to Contact PC World, page 4. ●

POWER TIP NO. 57

ProComm's Screen Snapshots

ProComm Plus 3.0 can save the contents of a screen to disk. Press <Alt>-G, and the program stores screen information in a file called PCPLUS.SCR. If the file already contains information, *ProComm* appends the newly captured data to the end of the file.

Greg Bear
Washington, D.C.

INFO WORLD

REPORT CARD

Multiuser Relational Databases

	(InfoWorld weighting)	Advanced Revelation 1.1	Dbase III Plus 1.1	Dbase IV 1.0	Informix-SQL 2.10.02	Paradox 2.0	Paradox 3.0	Rbase for Dos 2.0	Team-up 2.0
Price (base/single-user)		$950	$695	$795	$795	$495	$725	$725	$795
Performance									
Relationality tests									
Relational data entry	(50)	Excellent	Poor	Poor	Very Good	Excellent	Excellent	Excellent	Very Good
Relational reporting	(75)	Excellent	Poor	Very Good	Very Good	Excellent	Excellent	Excellent	Excellent
Relational querying	(50)	Excellent	Satisfactory	Good	Excellent	Excellent	Excellent	Excellent	Good
Programming language	(100)	Very Good	Good	Very Good	Excellent	Very Good	Excellent	Very Good	Very Good
Speed tests									
Standard operations	(50)	Satisfactory	Good	Very Good	Satisfactory	Good	Good	Good	Poor
Mixed-use model	(75)	Good	Poor	Good	Very Good	Good	Very Good	Excellent	Good
Transaction model	(75)	Very Good	Poor	Very Good	Excellent	Good	Satisfactory	Satisfactory*	Very Good*
Documentation	(75)	Good	Good	Poor	Excellent	Very Good	Excellent	Excellent	Good
Ease of learning	(50)	Poor	Poor	Satisfactory	Very Good	Excellent	Excellent	Excellent	Very Good
Ease of use									
Basic	(75)	Poor	Satisfactory	Very Good	Satisfactory	Excellent	Excellent	Excellent	Very Good
Multiuser features	(50)	Very Good	Unacceptable	Good	Excellent	Excellent	Excellent	Excellent	Very Good
Error handling	(150)	Very Good	Poor	Poor	Excellent	Very Good	Excellent	Good	Excellent
Support									
Support policies	(25)	Satisfactory	Good	Good	Poor	Good	Very Good	Very Good	Poor
Technical support	(50)	Very Good	Very Good	Satisfactory	Very Good	Good	Satisfactory	Very Good	Excellent
Value	(50)	Good	Unacceptable	Good	Very Good	Excellent	Excellent	Excellent	Excellent
Final scores		**6.8**	**3.5**	**5.4**	**8.3**	**8.1**	**8.9**	**8.5**	**7.8**

InfoWorld, April 10, 1989

The bottom line is 8.9

InfoWorld magazine tested and compared multiuser databases. With a bottom line score of 8.9, Borland's new Paradox® 3.0 beat the well-knowns and unknowns hands down.

So read what *InfoWorld*'s Report Card says about relational databases—and if you'd like to try Paradox 3.0 first, there's one more thing you can do.

Call 800-345-2888, ext. 100. We'll send you a free Trial Version of Paradox 3.0 and a reprint of *InfoWorld's* multiuser database review.

BORLAND

Code: MP45

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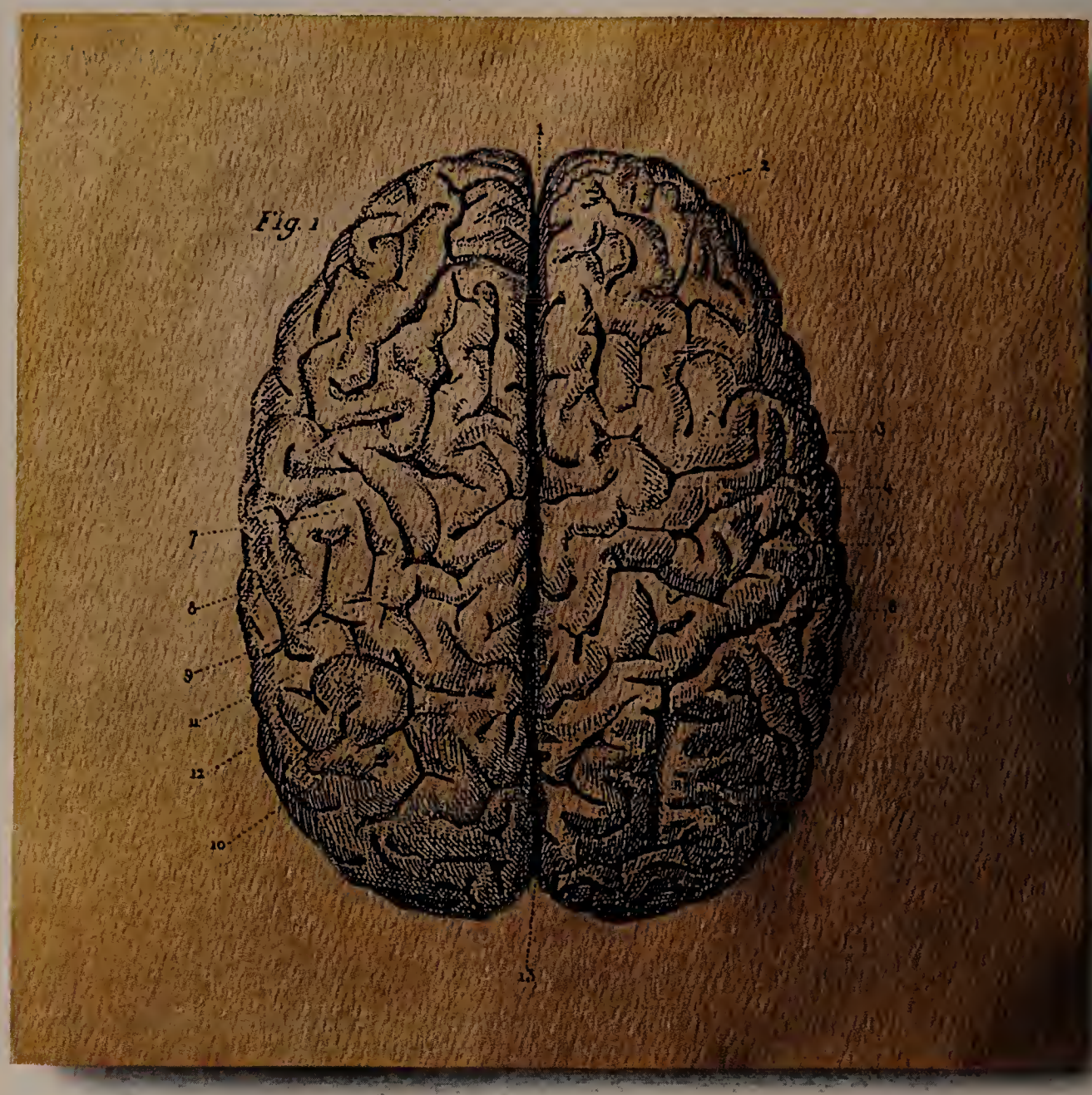
Now QuickPascal makes this software go even faster.



Even the quickest minds tend to brake suddenly when confronting new languages.

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The first Pascal that is not only powerful but easy, intuitive and 100% headache-free.

For example, our new hypertext QuickPascal Advisor offers on-the-job training: by cutting and pasting sample code you can learn to program in Pascal from scratch. And if you do hit a snag, the Quick Advisor can straighten everything out right on the spot.

To accelerate your thought processes even more, all of our processes are seamlessly integrated; no other Pascal offers you easier access to your editor, debugger and compiler.

What's more, QuickPascal is the first PC Pascal to offer Object Oriented Programming, or OOP. With objects, you can easily assemble whole programs from modular building blocks of code and data. And once you know Pascal, OOP is a snap. Which means, you get maximum productivity with minimum effort.

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THE HELP SCREEN

PC World offers answers and advice at every level

Memorize cryptic passwords, plug in to overseas powers, fine-tune SELECT's installation of DOS 4.0, differentiate PC1 from PC2, and discover a BIOS and DOS reference.

Karl Koessel

Your Password Is SKDESMDPM

Q. *I was recently chastised for using my name as a password to the department LAN. The system administrator said my password should not be a name, a common word, my social security or phone number, my birthdate, and so on. Furthermore, I'm supposed to use a different password for the E-mail system. But I just can't seem to remember a long password like the administrator suggests, such as OXQIEKS and 8JQT8HQ58F3. Any advice?*

Andrew J. Swanson
San Diego, California

A. The best password is one that you'll never forget and no one else will ever guess. Some administrators warn against the use of *any* real word. (You may recall last year's infamous Internet worm, which used the UNIX dictionary service to guess people's passwords.) But here are a few tricks to give your brain cells a rest.

Pick a phrase or sentence you'll remember, IBMPS2-MODEL60, for example (the more characters the better). Then replace each character with the one that precedes it alphabetically or numerically, and voilà—you have the password HALOR1LNCDK59.

If you're a touch-typist, try shifting your fingers left or right one key and then typing a word you can remember. Shifted to the left, for example, EISENHOWER becomes WUAWBGIQWE. Another variation is to use the first (or second or third) characters of each word in a long sentence. If you can remember "To be or not to be, that is the question," you should have little trouble recalling OEROOEHSHU.

Foreign Power

Q. *I'm in the Air Force and have been assigned to a base in Germany. I'm concerned about how 50-Hz electrical power will affect my PC and printer, a Tandy 1000SX with a Tandy hard disk card and a Tandy DMP 430 printer. I can use a step-down transformer to reduce the voltage from 220 to 110, but the transformer can't change 50 Hz to 60 Hz. Will I be able to operate my system at 50 Hz? Will doing so harm the equipment?*

David E. Smith
Omaha, Nebraska

A. These days electronic and computer equipment rarely depend on the frequency of AC. Although Tandy won't guarantee that its U.S. products will operate properly overseas, the spec sheets for your equipment say that 50-Hz power is acceptable. However, you should be less concerned about frequency than about improper voltage levels, which can seriously damage electronic equipment.

Power converters, which use lightweight electronics to cut *current* by suppressing half of each cycle, are fine for hair dryers, but they still allow the high *voltage* to pass through. Be sure that you use a step-down transformer, which is made from heavy coils of wire, to reduce Germany's 220-volt power to 110. The size you need depends on your equipment's total wattage. You should also be aware that In-

(continues)

ANTHONY RUSSO

Ted Standish has a bear of a job.

As Director of Information Resources for the North Atlantic Shaving Group of The Gillette Company, he's been given the task of simplifying and standardizing the business systems of the Company's European and North American divisions.

"With the coming of the European open market in 1992, we want to take a more unified approach to products, as well as to manufacturing and marketing," says Ted.

Ted Standish, Director of Information Resources, North Atlantic Shaving Group of The Gillette Company.

"Before Lotus Agenda, there were three things I always forgot. Tasks I assigned, promises I made, and I can't remember the third."

"This means dealing with hundreds of issues, projects, facts and people throughout the North Atlantic region every day.

"As you might imagine, reams of little pieces of paper with notes, phone numbers, ideas and who-knows-what-else were beginning to take over my office."

Which is why Ted visited his local computer software reseller and bought Lotus® Agenda,® the personal information manager.

In Agenda, Ted has a tool that's helping him manage people, projects, ideas, plans and information, all with incredible efficiency.

Because Agenda allows him to enter

Agenda is also available in an OS/2® version. If for any reason you're unsatisfied with Agenda, return it with your sales slip within 30 days of purchase and we'll refund your full purchase price.

Lotus Agenda Demo Kit Offer

See for yourself how Agenda can put you in control of your information. Simply mail this card to Lotus or call **1-800-345-1043** to order a $10 Demo Kit (refundable when you purchase Agenda). Please specify the appropriate disk format:

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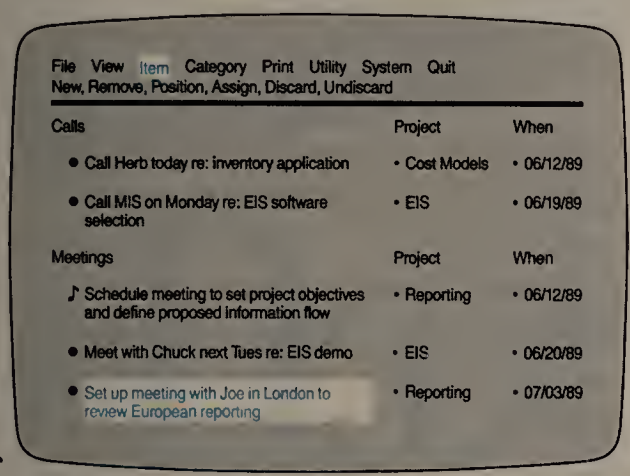
information into his PC without having to structure it in advance. Agenda automatically arranges the data any way Ted wants so he can understand it better, formulate new ideas better and extract the answers he needs better.



The new Agenda Activities Planner gives you step-by-step instructions that put you in control of your information quickly.

"It lets me focus more on using my information and less on processing it," says Ted.

"For example, I can dump in all my 'to do's' and have Agenda organize, prioritize and categorize them automatically. And whenever I call up a project, person or due date, I'm instantly given all the background information I need to make smart decisions.

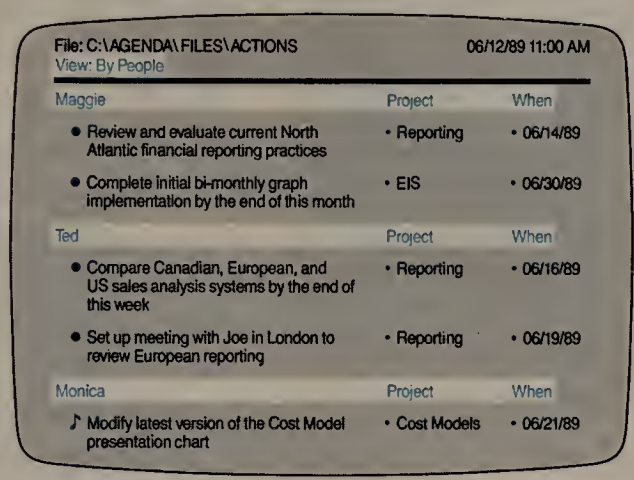
"Now I no longer worry about what I told someone in England, or what somebody else set up in France, or who's in Boston doing whatever.

"Agenda allows me to quickly consolidate all these things in a single place. And discover relationships between people and responsibilities, projects or any other relevant topics that come up.

"Now I can see at a glance who's promised to deliver what and by when. More important, I can keep my own promises."

And Ted isn't the only business person who's come to rely on Lotus Agenda.

The Royal Bank of Canada is using it to monitor international economic and political activities. The accounting and consulting firm of Laventhol & Horwath is using it to track and support its computer systems all over the country. And the CAP International market research company is even using it to predict trends.



Agenda automatically files items in all relevant categories. Then you can view information from different perspectives.

The list goes on and on. The point is, Agenda can significantly help you, too. Especially now that it comes with an Activities Planner that gives you simple, step-by-step instructions so you can sit down and create your own personalized task manager.

If you'd like to learn even more about how Agenda can put you in control, just send us $10 for an Agenda demo kit. **Call 1-800-345-1043 and ask for demo kit AOD-3058 for 3.5" or AOD-3053 for 5.25"** (of course, we'll refund your $10 when you buy Agenda).

Then you'll see first hand how people like Ted Standish are working better, thinking better and solving problems better.

Not to mention remembering better.

Lotus Agenda

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CONFIG.SYS

```
DEVICE=C:\DOS\ANSI.SYS  /X
DEVICE=\IBMCACHE.SYS  128  /E  /P4
BUFFERS=25,8
BREAK=ON
FCBS=20,8
FILES=8
LASTDRIVE=E
INSTALL=C:\DOS\FASTOPEN.EXE
C:=(150,150)
SHELL=C:\DOS\COMMAND.COM  /P  /E:256
```

AUTOEXEC.BAT

```
@ECHO OFF
SET  COMSPEC=C:\COMMAND.COM
VERIFY OFF
PATH  C:\;C:\DOS;C:\PROGDIR;C:\MOUSE1
PROMPT  $e[1m$p -$g$e[0m
C:\DOS\GRAPHICS  GRAPHICS
MOUSE
```

FIGURE 1: DOS 4.01's SELECT program builds a CONFIG.SYS file and an AUTOEXEC.BAT file.

terTAN, which handles sales of Tandy's overseas products, is not obliged to fix, and may be unfamiliar with, your U.S. system.

Optimizing DOS 4.0

Q. *I recently installed DOS 4.01 on my IBM PS/2 Model 60's 70MB hard drive. The Install disk's SELECT program "suggested" various CONFIG.SYS and AUTOEXEC.BAT commands [see* **FIGURE 1***]. Can you explain what each command does and whether running IBMCACHE, BUFFERS, and FASTOPEN together is counterproductive? Basically, I run standard business programs. Please help me optimize my system.*

Scott A. Binder
Chester, New York

A. SELECT does a good job of setting up a system, but you can indeed fine-tune those settings for better performance. Unless you use <Print Screen> to print *graphics* screens, remove the GRAPHICS command from AUTOEXEC.BAT. That done, CONFIG.SYS is where you need to concentrate.

Initially, DOS loads standard device drivers for the keyboard, screen, printer, floppy disk, hard disk, and clock. Each driver decreases the amount of user RAM available. Let's look at yours.

ANSI.SYS augments the keyboard and screen drivers, enabling you to reassign keyboard keys, manipulate the cursor, and control screen colors. The optional /X lets you define the extended keys of the enhanced keyboard (the middle keypad) differently from their counterparts on the numeric keypad. Using the /K parameter prevents such redefinitions. A /L causes 43- or 50-row screens (set by a MODE command) to be retained for programs that would otherwise reset to 25 rows.

The DEVICE = \IBMCACHE.SYS command installs a disk cache driver, which takes about 8K of user RAM, to improve disk performance. The parameters specify the size in K (128), place the cache in extended memory (/E) instead of user RAM, and set the cache page size in sectors (/P4). Since you aren't using extended memory for anything else, increase the size of the cache to use more extended memory.

BUFFERS can specify from 1 to 99 buffers, or up to 10,000 if the /X parameter finishes the command, telling DOS to put them in expanded memory. Each buffer uses 532 bytes of user RAM. A buffer works like a small disk cache, holding a sector of data read from or written to disk. The number after the comma, if present, is the number of look-ahead buffers, up to 8 at 512 bytes apiece. Buffers degrade disk cache performance, so set the number of buffers to 3 to reclaim over 15K.

BREAK = ON instructs DOS to look for a <Ctrl>-<Break> to get out of an application every time the application makes a DOS call. It's of no use to you, so remove it—system performance will improve.

FCBS sets the number of file control blocks that DOS can open at one time, and the number that can't be closed. A file control block is a CP/M–like structure for handling files. Each takes up just 37 or 44 bytes but is used only by old (pre–DOS 2.0) applications and only if you load SHARE. Use FCBS = 1,0 and you'll get back almost 1K.

FILES is the replacement for FCBS and specifies the number of files that may be open at once. The default is 8, the minimum; the maximum is 255. Above 8, each file adds 64 bytes to DOS. If you haven't seen the error message 'Too many open files', then 8 is sufficient.

LASTDRIVE specifies the "highest" letter that may be assigned to a floppy or hard drive, to an installed device driver such as VDISK.SYS, or, by the DOS command SUBST, to a subdirectory. The command has no effect on performance or RAM.

INSTALL loads the memory-resident commands FASTOPEN.EXE, KEYB.COM, NLSFUNC.EXE, and SHARE.EXE, placing them in an optimal position in memory. DOS 4.0's FASTOPEN.EXE stores in memory the loca-

(continues)

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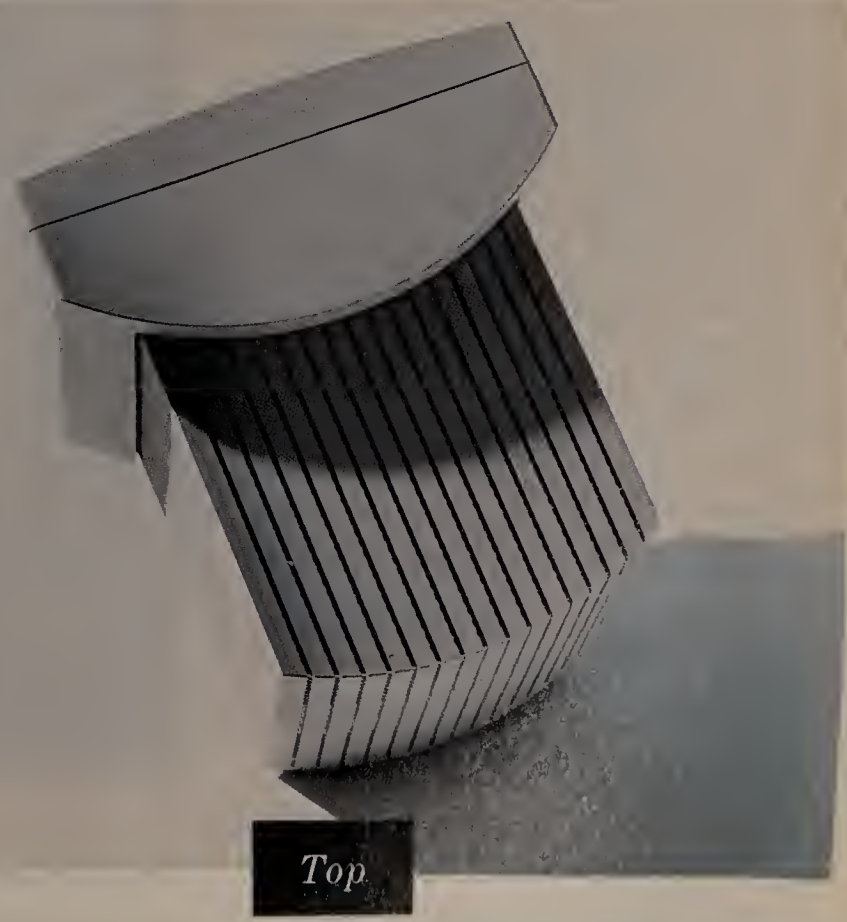

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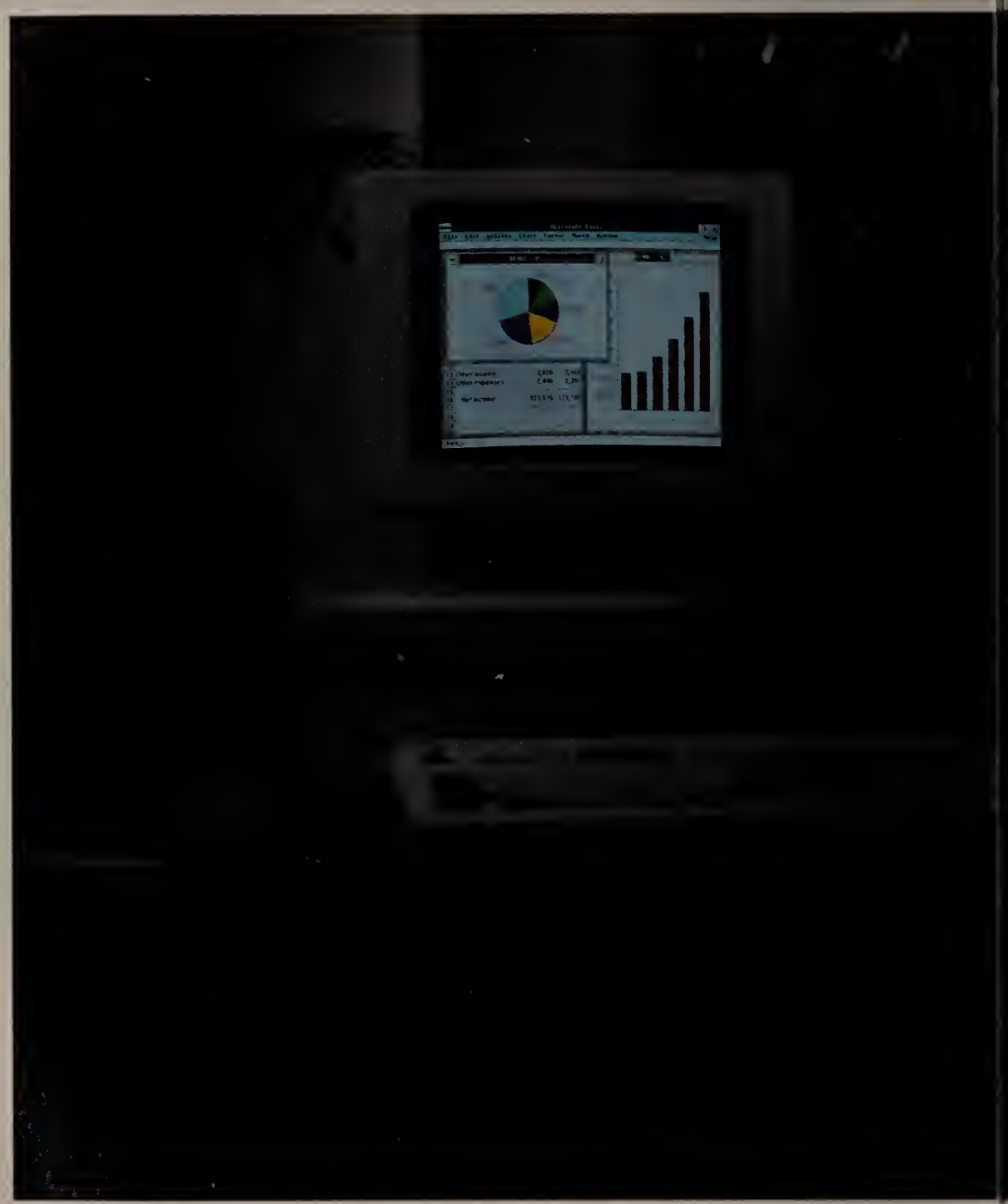

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PCW-7

tion and/or the contents of the most recently accessed directories and files of one or more hard disk drives. Subsequently, a stored directory or file can be accessed from RAM instead of from the hard drive.

The first number following FASTOPEN specifies the number of directory or file entries for the indicated drive; the second sets the number of "continuous" buffers for storing directory and file contents. Each file entry takes 35 bytes from user RAM, and each buffer takes 16 bytes. The default is (34,34). The first number should at least be greater than the system's deepest level of subdirectories.

If you need RAM more than speed, you can reduce the numbers or remove FASTOPEN altogether. However, as with any cache, setting the sizes too small can be worse than not using a cache at all. The optional /X parameter tells the command to put the entries and buffers in expanded memory but limits the total amount of usable space to 16K.

SHELL specifies a replacement for COMMAND.COM, DOS's command processor. Your SHELL command permanently (/P) replaces COMMAND.COM with a copy of itself to increase environment space to 256 bytes (/E:256). The maximum is 32768. Unless you see the message 'Out of environment space', don't increase the /E: value.

Note that in addition to considering which device drivers and memory-resident programs to install, you must also consider the installation order. Load device drivers first, then commands that modify DOS's defaults, and then INSTALL's programs. SHELL should always be loaded last.

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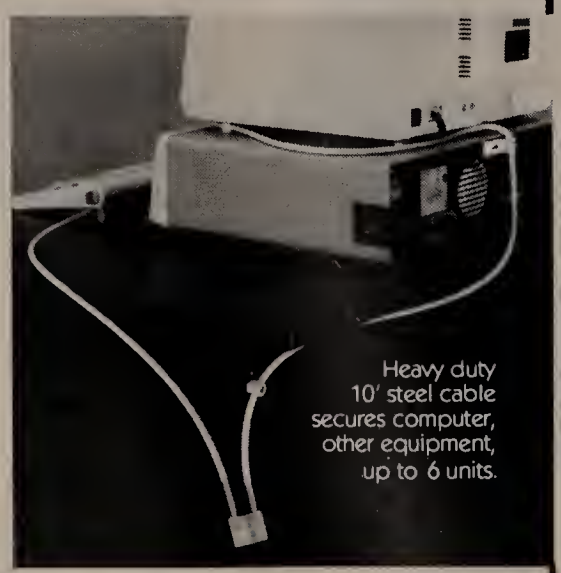

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I'd like to replace with a 30MB hard disk. I've heard that the BIOS of older PCs may not support a hard drive. How can I tell if my PC is upgradable?
Bob Perfetto
New York, New York

A. It's true that the BIOS of early IBM PCs, known as PC1s, does not support controller cards that use on-board ROMs, such as EGA and VGA video adapters and hard drive controllers, or device drivers. I can tell that you have a PC2 (which does not suffer from this limitation) because you have a third-party storage system.

To verify that yours is a PC2, insert the DOS disk that contains the DEBUG command into drive A:, type **A:DEBUG**, and press **<Enter>**. At DEBUG's hyphen prompt, type **D F000:FFF5 L9** and press **<Enter>**. If the date displayed on the right side of the screen is 10/27/82 or later, you have a PC2. Press **Q** to leave DEBUG. Unfortunately for those wanting to upgrade a PC1, IBM no longer sells BIOS upgrade kits, and compatible ROMs are no longer available.

Something to Bark At

Q. *It seems that every other month I see a program in* PC World's Star-Dot-Star *column that refers to BIOS Interrupt routines and DOS function calls. I assume that such services are encoded in the ROM BIOS and in DOS, but I have no idea how to use them. Can you recommend a book that lets the cat out of the bag?*
James W. Perry
Aurora, Colorado

A. *PC World's Star-Dot-Star* editor, Tom Swan, tells me you should pick up Ray Duncan's *Advanced MS-DOS* (Microsoft Press, Redmond, Washington, 1986). He says when it comes to DOS programming in C and assembly language, this book is the cat's meow.

To send correspondence or to submit material for publication in this column, please see How to Contact PC World, page 4. ●

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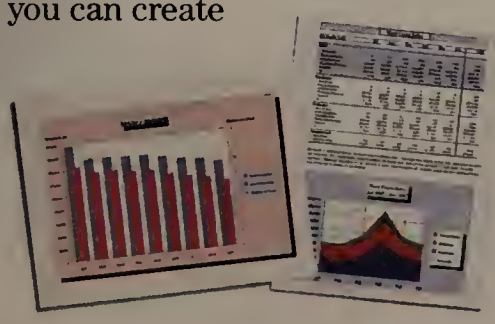

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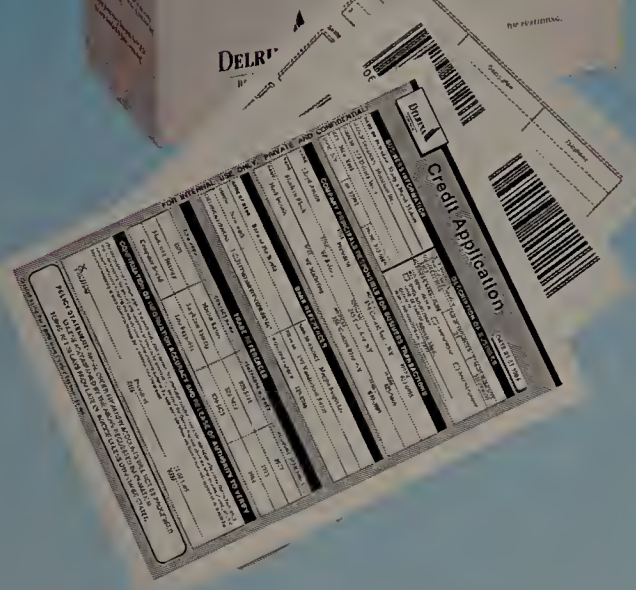

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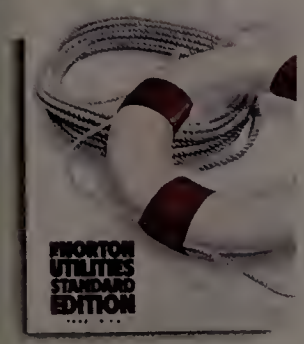

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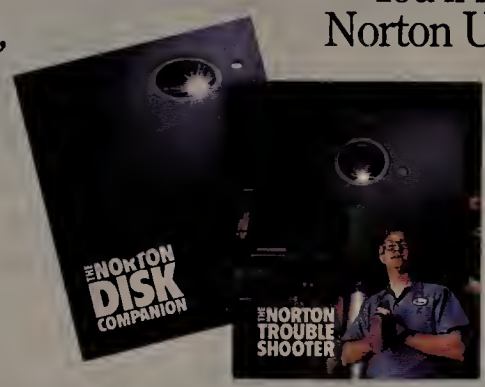

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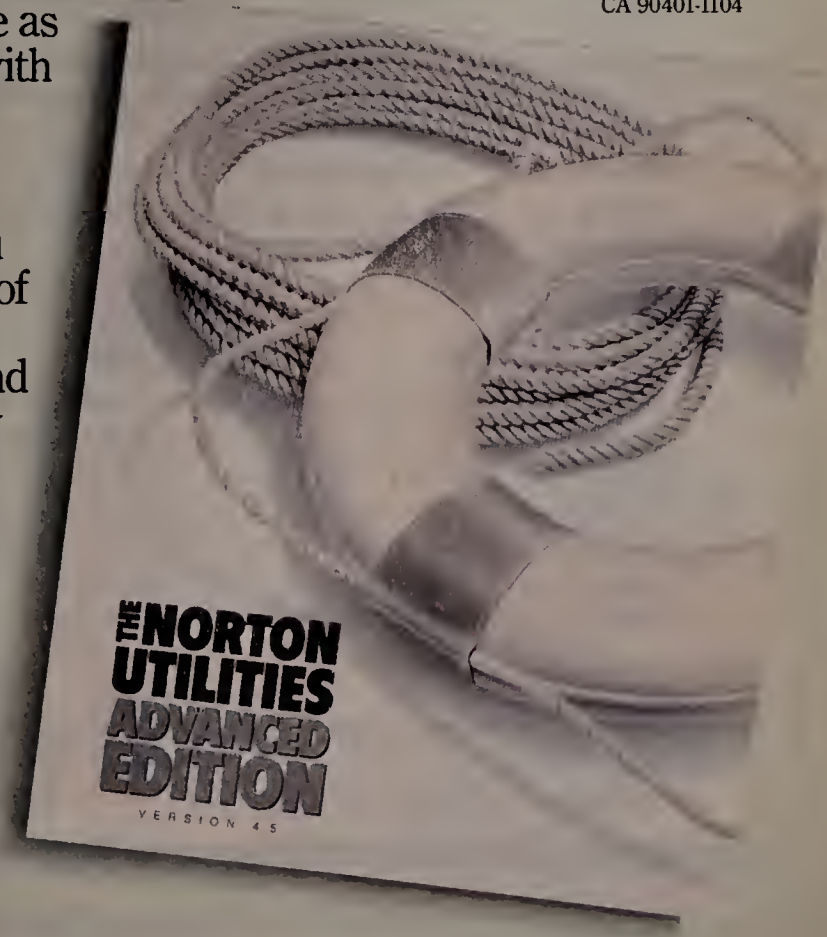

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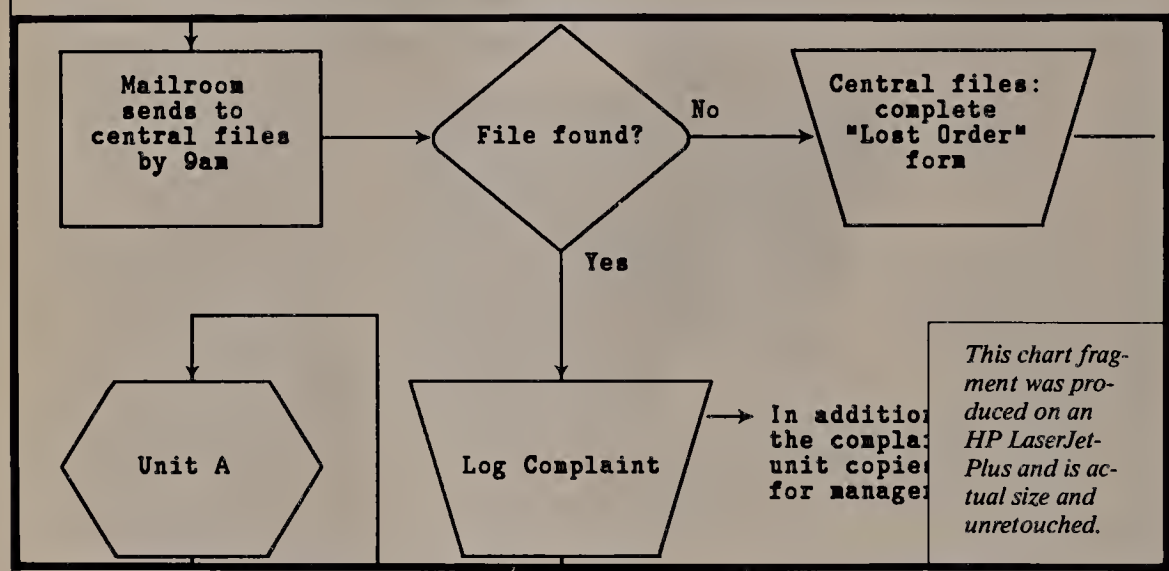

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Next in

PC WORLD

August

Windows at Work

Senior Editor Robert Luhn gathers the latest news from the graphic-interface front for our next Windows Special Report. In offices across the country, *Windows* is winning converts—and helping users learn programs in record time. Get the scoop on a handful of new *Windows*-based applications, and learn why businesses large and small are leaving DOS behind.

PostScript Goes Into Business

Chances are, your favorite business applications now support the PostScript standard. And the latest generation of Post Script printers offers higher performance at a lower price than ever before. We look at eight machines with the power and versatility to make your printed pages command attention.

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3. Are you interested in computer products for:
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B ☐ Business

4. How many PCs do you have installed now?
A ☐ 1-10
B ☐ 11-20
C ☐ Over 21

5. How many PCs do you (your company) plan to purchase in the next twelve months?
A ☐ 1-10
B ☐ 11-20
C ☐ Over 21

6. Is your requirement:
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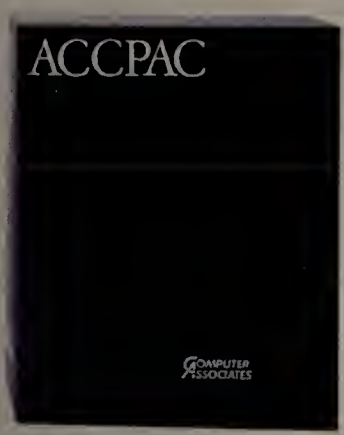

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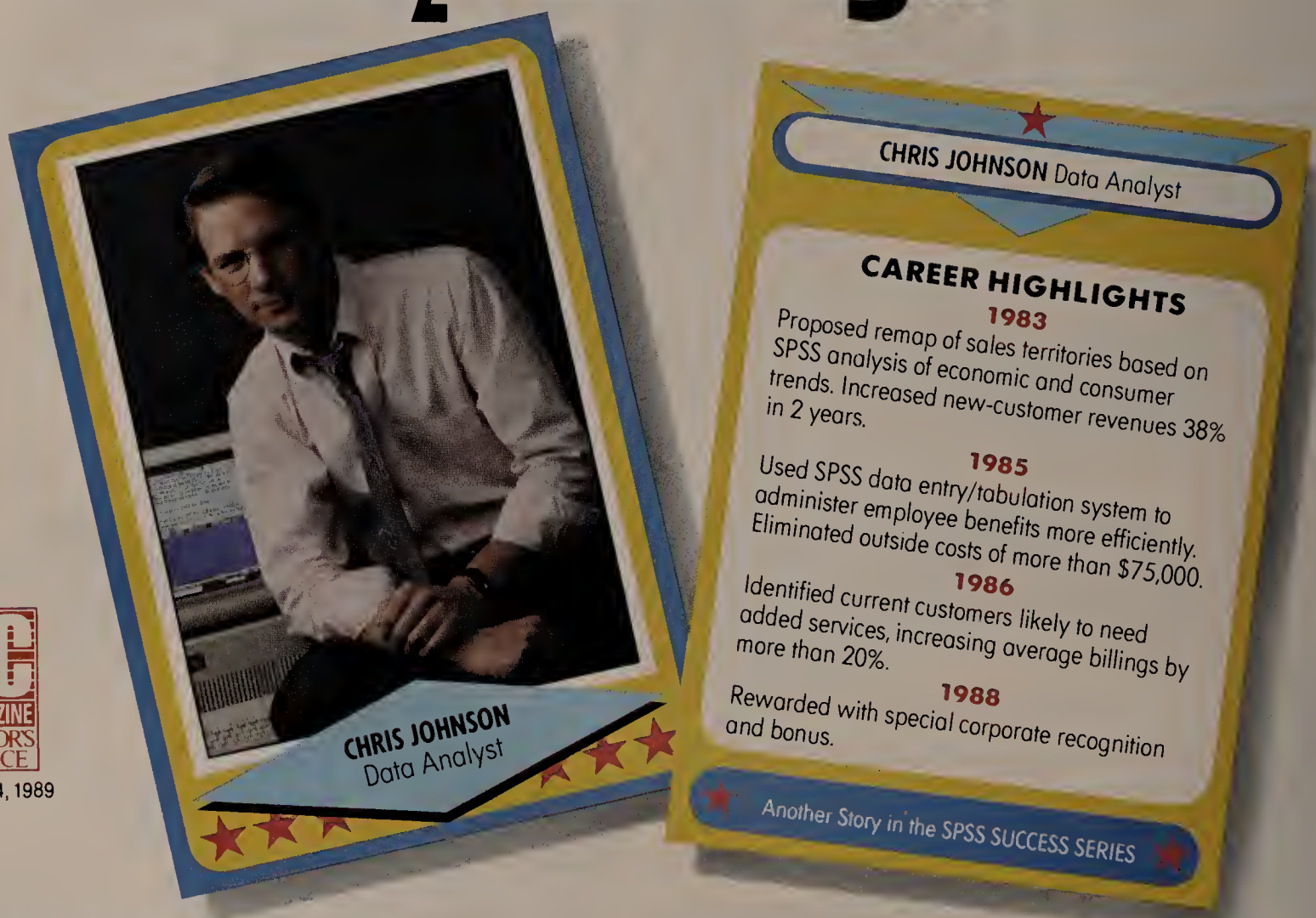

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March 14, 1989

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WINDOWS JOURNAL

First-hand dispatches from the Windows front

This month Stewart Alsop shares some ruminations on a theme: What's missing from Windows?

Stewart Alsop

Now that the word's out in the public relations world that I'm writing about *Windows*, I've got some serious software sitting on my hard disk. I've got four drawing programs (*Arts & Letters*, *Corel Draw*, *Designer 2.0*, and *Opus I*), one paint program (*PC Paintbrush IV*), one data base (*Quartz*), one word processor (*Ami*), one spreadsheet (*Excel*), two desktop publishing packages (*PageMaker* and *db Publisher*), and a variety of utilities (most notably *Scrapbook +*). I really have to fall back on only two character-based programs, both communications related (*Prodigy* and *cc:Mail*), to get my work done.

ANTHONY RUSSO

But I have this nagging feeling that something is missing. And it's taken me a couple of weeks to nail down what that something is: choice.

A Bit of History

Let me explain. Back in 1985, when the Macintosh was a machine in trouble and the professional soothsayers of the computer industry were climbing over each other to say the Macintosh was dead, people who actually used the machine knew that it would not only survive but prosper. A lot of this feeling came from the trickle of software that had just begun to appear. *PageMaker* showed up in May or June (not to mention *MacPublisher* and *ReadySetGo*); *Excel* in September (not to mention *Jazz* and *Crunch*); *FileMaker* in March (not to mention *OverVue*, *Helix*, and *pfs:file*). The Macintosh user was still stuck with *MacWrite* or *Microsoft Word* for word processing, but in almost every other category, there was a choice among three or more programs with real differences in design and with distinct features appealing to different kinds of users.

When There's a Hole...

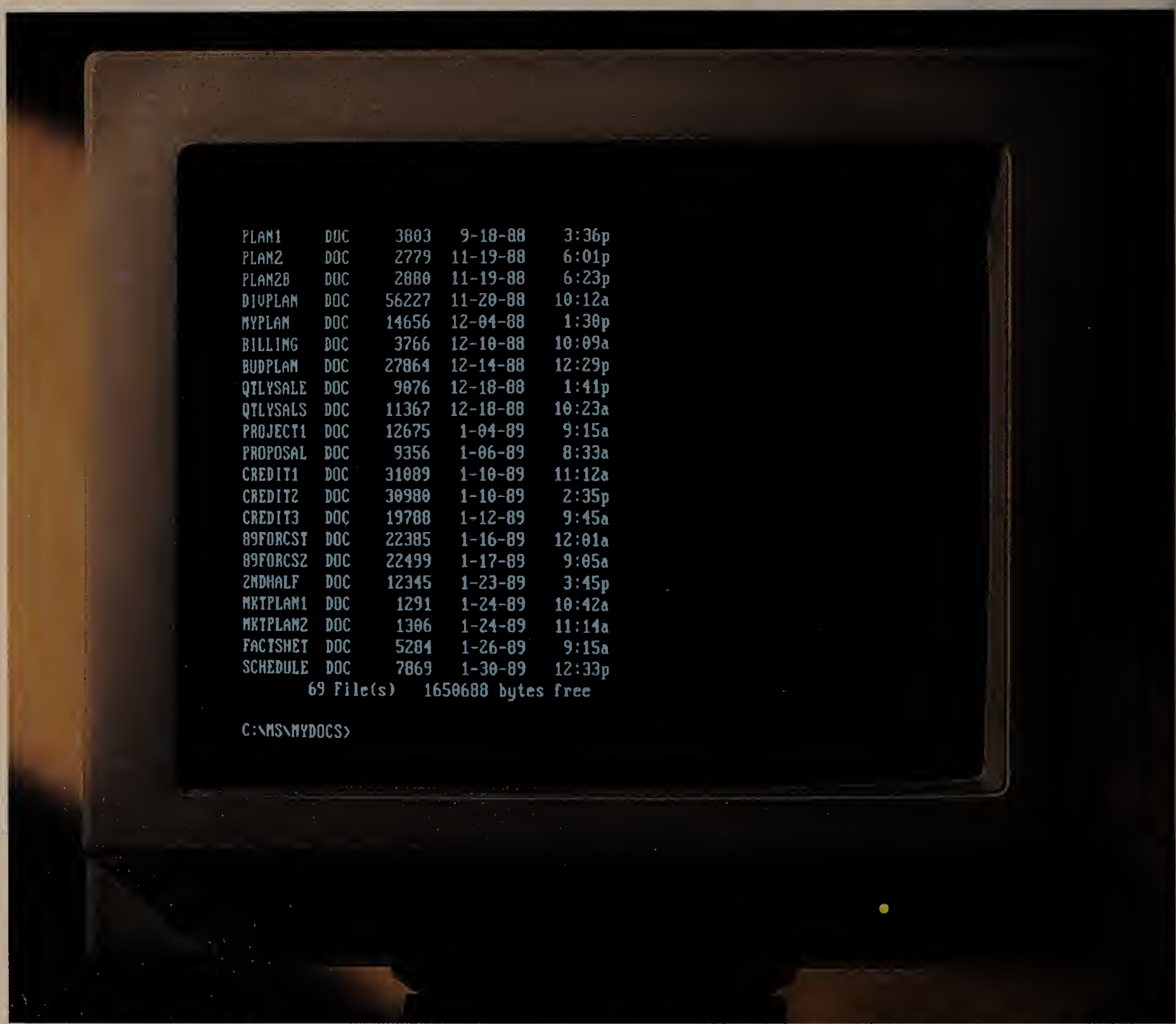
All of this happened about 18 months after the Macintosh itself was introduced. Here we are, mid-1989, three and a half years after *Windows'* original version shipped. This is the year (like 1986 was for the Macintosh) that Microsoft predicts *Windows* will become a clear hit and gain widespread software support and sales momentum. But the only category of applications where I have a serious choice between programs with significantly different capabilities is vector drawing.

Even more disturbing, I haven't seen any explosion in shareware or public-domain software to fill in the gaps. For instance, I would love a little program to map out memory usage so I know how much program code is being swapped to expanded memory or to disk. (That way I could optimize the performance of the machine by keeping an eye on my use of memory.) But I don't. The reason? People who write shareware programs are still working with plain DOS, not with *Windows*.

Windows represents the next-generation operating environment for so-called IBM-compatible computing. And there's no dearth of leading-edge software development for *Windows*. A company called Manageware has developed a five-dimensional spreadsheet that runs under *Windows* and lets you rotate models from five points of view while still using the familiar row-and-column metaphor. Another

(continues)

Do they call it a h
it's so hard to find wh



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company, Multex, is creating an application for brokers that integrates data from up to 12 different sources into an environment where brokers can use familiar tools to massage the information. And both American Airlines and United Airlines appear to have standardized on *Windows* as the interface for their agents' workstations.

Fill It

So what do we need in the world of *Windows?* I think we need missionary fervor, the very thing that everybody laughed at Steve Jobs for when he called the Macintosh "insanely great!" But the fact is that the industry's so-called religious nuts motivated a lot of interesting, leading-edge experimentation in the design and development of application software. Indeed, one area of exploration—user programming—led to the development of a program called *HyperCard*, which was delivered as an extension to the Macintosh operating system in 1987. Only now is it being matched under *Windows*, with forthcoming *HyperCard*-style work-alikes from Asymetrix and Spinnaker Software.

That's what bugs me most about *Windows*. Virtually everything it does was done two years ago on the Macintosh. The *Windows* programs that really break new ground (and there are a few of them) are still under development and won't reach the marketplace until late this year or early next year.

(continues)

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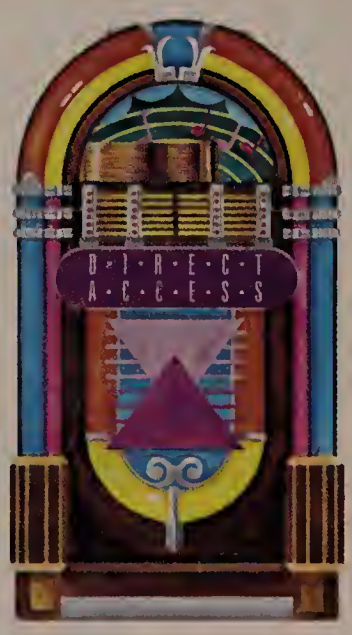

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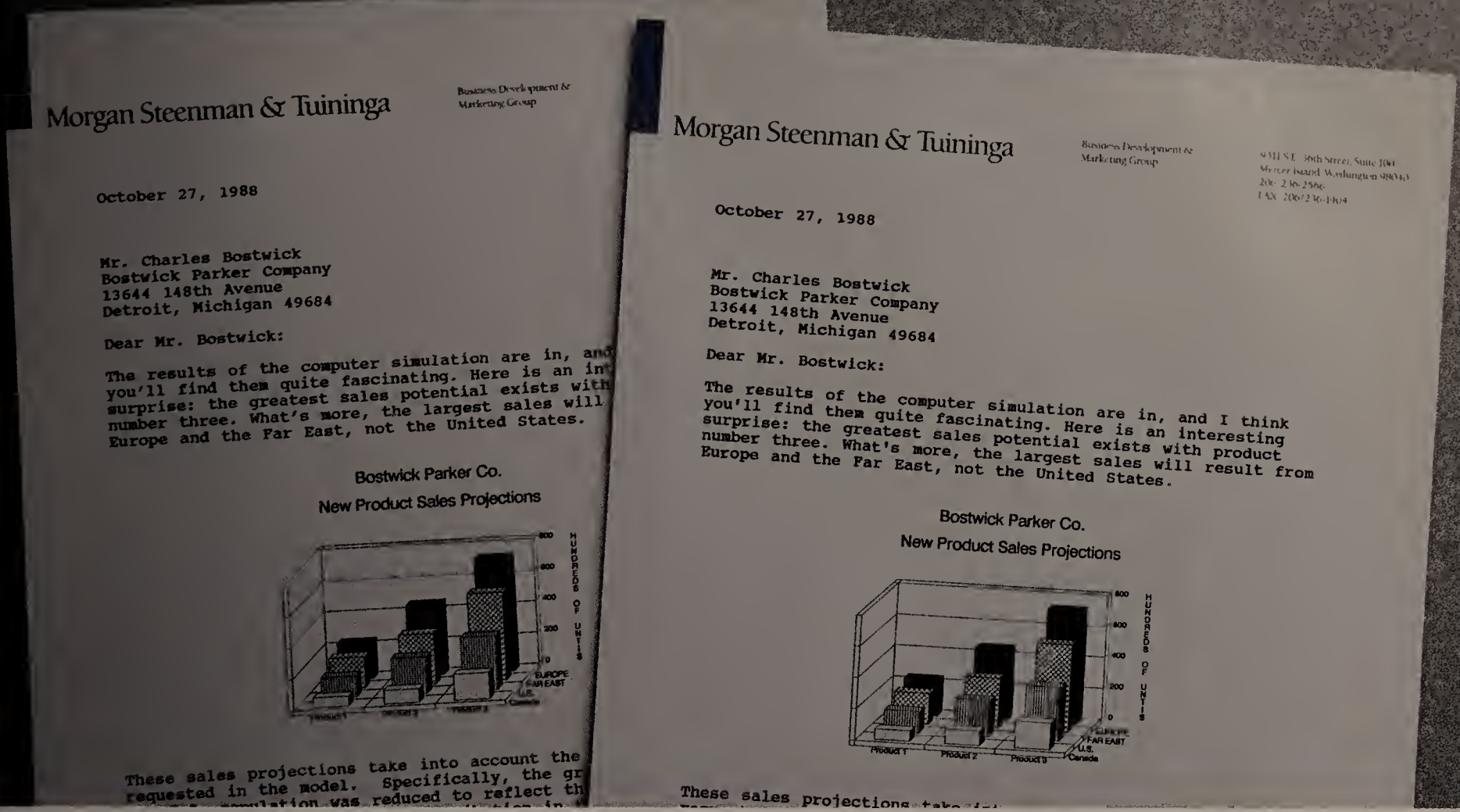

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If I were a rational and mostly normal user of computers, I'd never learn an entirely new system and buy new software unless I knew I could get the specific programs I absolutely had to have, and thought that I was buying into a robust and exciting new world of experimentation and development. If I were going to expose myself to the risk of a new environment, I'd want to know that a lot of people out there felt very strongly about that environment.

A Moving Target

I'd like to see fewer developers getting out their calculators to see how many copies of a program they might sell if they reached *x* percent of all *Windows* users. The developers who have done the best work under *Windows*—at companies like Premise Software, Asymetrix, and Micrografx—say it's an incredible pain to write software for *Windows* and wish it weren't quite such a moving target, with basic concepts changing between each major version. Instead, I'd like to see developers drooling over the chance to use this environment to solve problems and amaze the industry with their technical and programming virtuosity. Then perhaps there wouldn't be so much confusion about *Windows*' role in the industry. ●

Stewart Alsop is editor and publisher of P.C. Letter *and a contributing editor for* PC World.

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Circle 258 on reader service card

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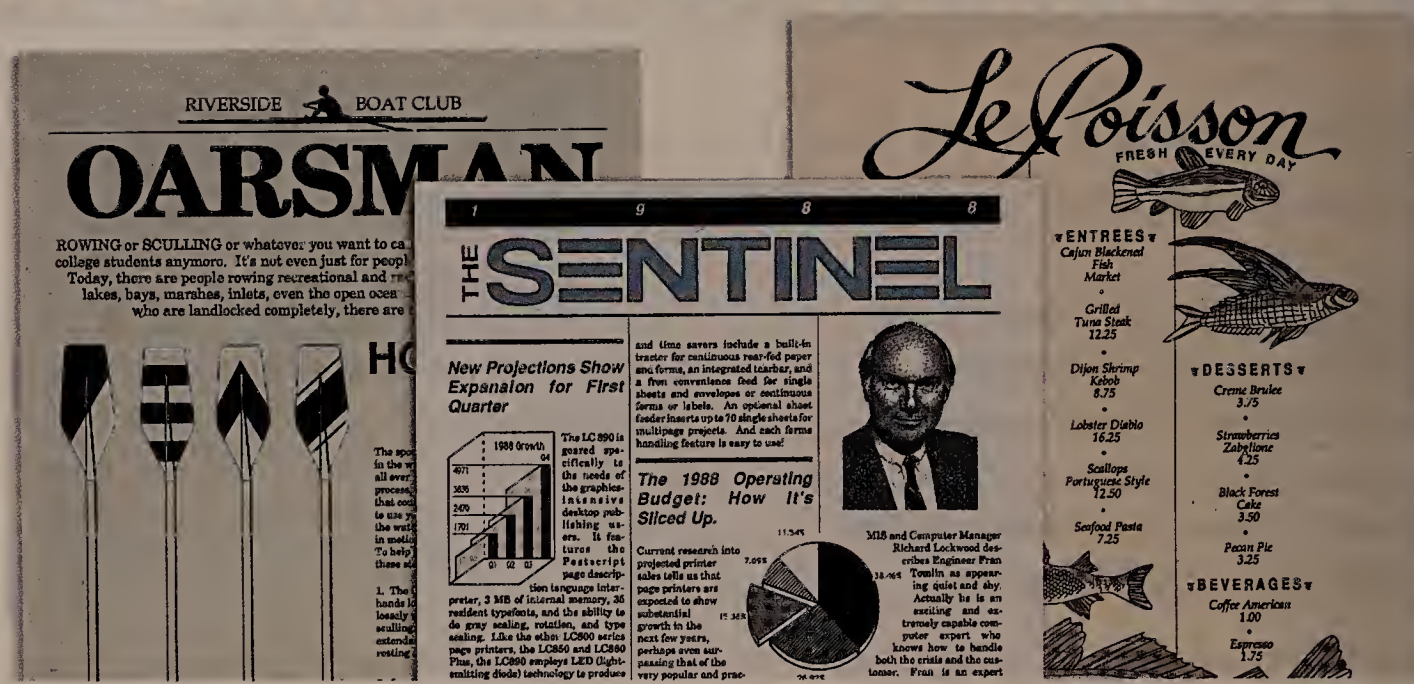
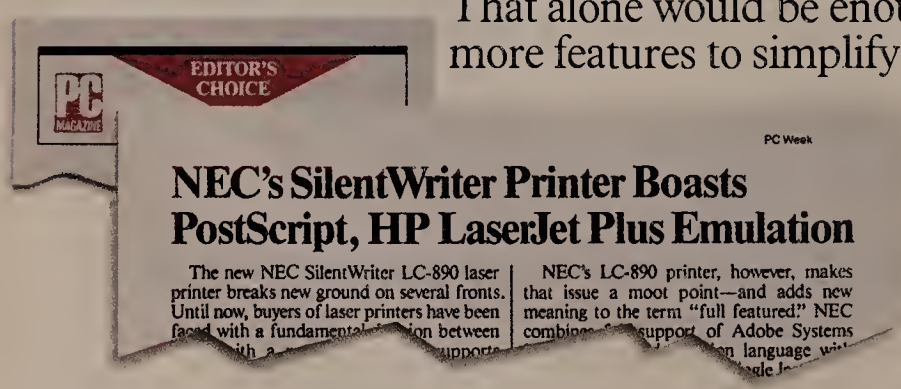


Our Silentwriter™ LC890 is the first desktop publishing printer that gives you both popular standards for creating graphics and type: true Adobe PostScript® and LaserJet Plus emulation. That alone would be enough to cause headlines. But we also added many more features to simplify desktop publishing. Like both Apple and IBM compatibility. *PC Week* stated, "the LC890 is actually better than having both an Apple LaserWriter Plus and an HP LaserJet Plus on your desk." Equally impressed, *PC Magazine* awarded it an "Editor's Choice." And cited it in their "Best of 1987" issue.



And because the Silentwriter has a simple, trouble-free printing mechanism, it will be creating headlines for years to come. In fact, it's twice as reliable as ordinary lasers, with an average life of 600,000 pages.

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Edited by ERIC BENDER

Throughput Seen as Key

Vendors Draw Battle Lines for SQL Data Base Servers

Migration Costs May Deter Users

Fox's David Fulton sees a need for data base server software that's as easy to install as a math chip.

PETER YATES

When the guest list includes IBM, Microsoft, Ashton-Tate, Oracle, Novell, Borland, and other top software names, you know the party will be hot. The theme is SQL-oriented data base servers, and before it's over there'll be a rumble.

The idea is to create a multiuser data manager that's designed for top performance and distributed processing on a network. You load the server with transactional processing smarts to make it a flexible, cost-effective alternative to minicomputers and mainframes for complex, mission-critical data base operations.

Unlike a traditional multiuser data manager, which performs processing on networked PCs while the server just stores files, a SQL server exploits the client/server architecture to spread work around. Rather than downloading an entire data base, a client PC asks for specific tables and rows, leaving most indexing and sorting chores to the server. This reduces network traffic and frees up the PC front end for querying and reporting.

Additionally, because servers and front ends speak a common SQL (Structured Query Language) also shared by mainframe and mini data bases, users should be able to issue SQL queries (usually translated from an existing PC data base language) without knowing where the data resides; answers may return from the local server or a distant mainframe.

Almost every major data management player has announced a SQL data base server or a compatible front end, several of which have already arrived. Gupta's *SQLBase*, which runs on both DOS and OS/2 platforms, was first out of the chute in 1986. *SQLBase* was recently joined by Novell's *NetWare SQL*, which works with DOS workstations and Novell's *NetWare* software, and by XDB's DOS-based *XDB Server.*

(continues next page)

Focus on Markets Pays Off for Zenith Data

Driving Laptops Into Retail Stores

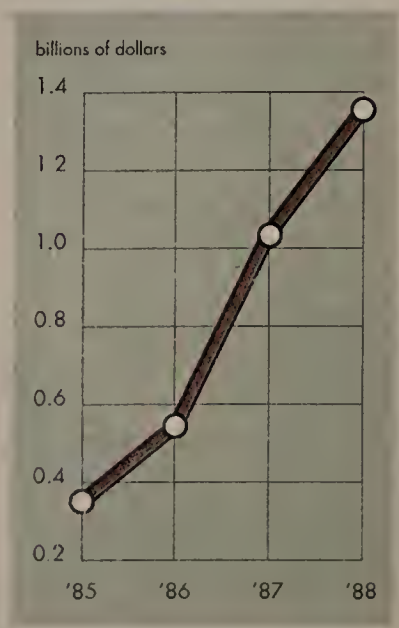
Best known for heavyweight government contracts and lightweight portables, Zenith Data Systems quietly makes a striking claim—last year it shipped more DOS-based PCs worldwide than anyone but IBM.

Tandy disputes that claim, and ZDS doesn't loom large if you wander into most computer outlets. StoreBoard figures show ZDS taking only 1.6 percent of U.S. retail sales. But the Glenview, Illinois–based ZDS and other Zenith Electronics subsidiaries sold almost $1.4 billion of PC products last year. And Dataquest puts ZDS's share of U.S. personal computer sales (DOS machines and otherwise) at a respectable 3.5 percent.

Zenith Electronics formed ZDS in 1980, soon after acquiring Heath, a personal computer kit pioneer. By the time the first ZDS system appeared in 1982, almost all of the current top executives had joined. Late that year when ZDS decided to take the IBM-compatible

(continues on page 66)

Sales Climb for Zenith



Zenith Electronics' sales of computer products, primarily by its Zenith Data Systems subsidiary, have grown quickly.

SQL Servers

(continued)

An Oracle server for Banyan's UNIX-based *Vines* net was slated for spring delivery.

Others, however, see OS/2-based servers as the future. *SQL Server*, developed by Microsoft, Sybase, and Ashton-Tate and now expected to ship by mid-year, has already attracted numerous front-end supporters. By year-end, expect OS/2 servers from IBM, Oracle, Microrim, and possibly Lotus.

If the server market seems crowded, the front-end market resembles a full-blown riot. Ashton-Tate's *dBASE IV* will support *SQL Server*. Borland's *Paradox* will talk to *SQL Server*, IBM's OS/2 Extended Edition data base server, *NetWare SQL*, and *Oracle Server*. WordTech's *dBXL* and *Quicksilver* will query Oracle, Novell, and Gupta servers. *DataEase* will work with IBM and Microsoft products. Microrim has set off on its own with its *Atlas* enterprisewide net, promising both a server and a graphics-based front end. Lotus hasn't clarified its server strategy, but outsiders expect a cooperative development/marketing arrangement with Oracle in which Lotus concentrates on the front ends. And Fox Software will offer a *FoxServer* back end based on *NetWare SQL* in the first quarter of 1990, along with a corresponding front end for its upcoming *FoxPro* data manager.

For packages ported from existing multiuser PC data bases, performance will be a key issue. Yet it's unlikely that smaller nets will see the dramatic speedups that large nets can expect. If so, the hefty investment in rewriting applications, buying a multimegabyte dedicated server, and (in most cases) moving up to OS/2 and a new net operating system might not pay off.

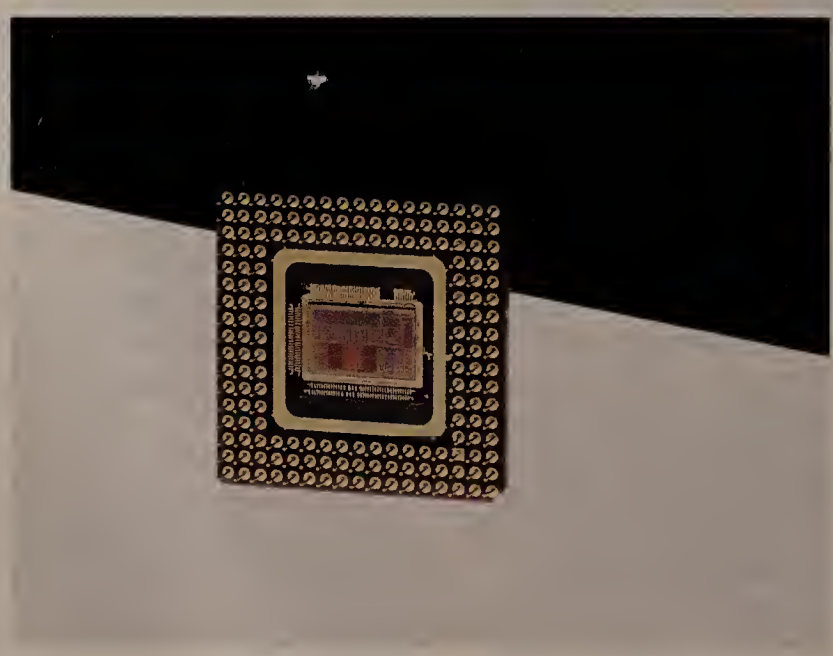
"The migration costs are high," says Lee Doyle, a network analyst at International Data Corporation in Framingham, Massachusetts. Further, administration will grow much more complex and time-consuming. "Small work groups will find some performance improvement, but is it worth the increased hassle? Probably not." Additionally, server products won't appear soon at your typical ComputerLand, because they'll be tough to sell and support.

Until developers learn how to tap the servers' complex data integrity controls and distributed processing, "there's only one reason to buy a data base server—to enhance performance," says David Fulton, president of Fox Software. Fulton suggests that some server offerings are too complex for most PC net environments. "You should be able to drop a server into a network like you'd put a math chip into a PC."

"The traditional file server approach is far from dead," adds Richard Schwartz, Borland's chief technical officer, who calls for an approach that combines the best of both technologies. —*Eric Brown*

486 Chip Pushes Envelope

Intel Stresses 386 Compatibility



PCs built around Intel's 1.2-million-transistor processor will begin appearing in late 1989 or early 1990.

FRED STIMSON

Buy now and realize immediate productivity gains, or wait a year for the next chip generation that will make today's offerings obsolete: That's the conundrum PC buyers have faced ever since micros were introduced.

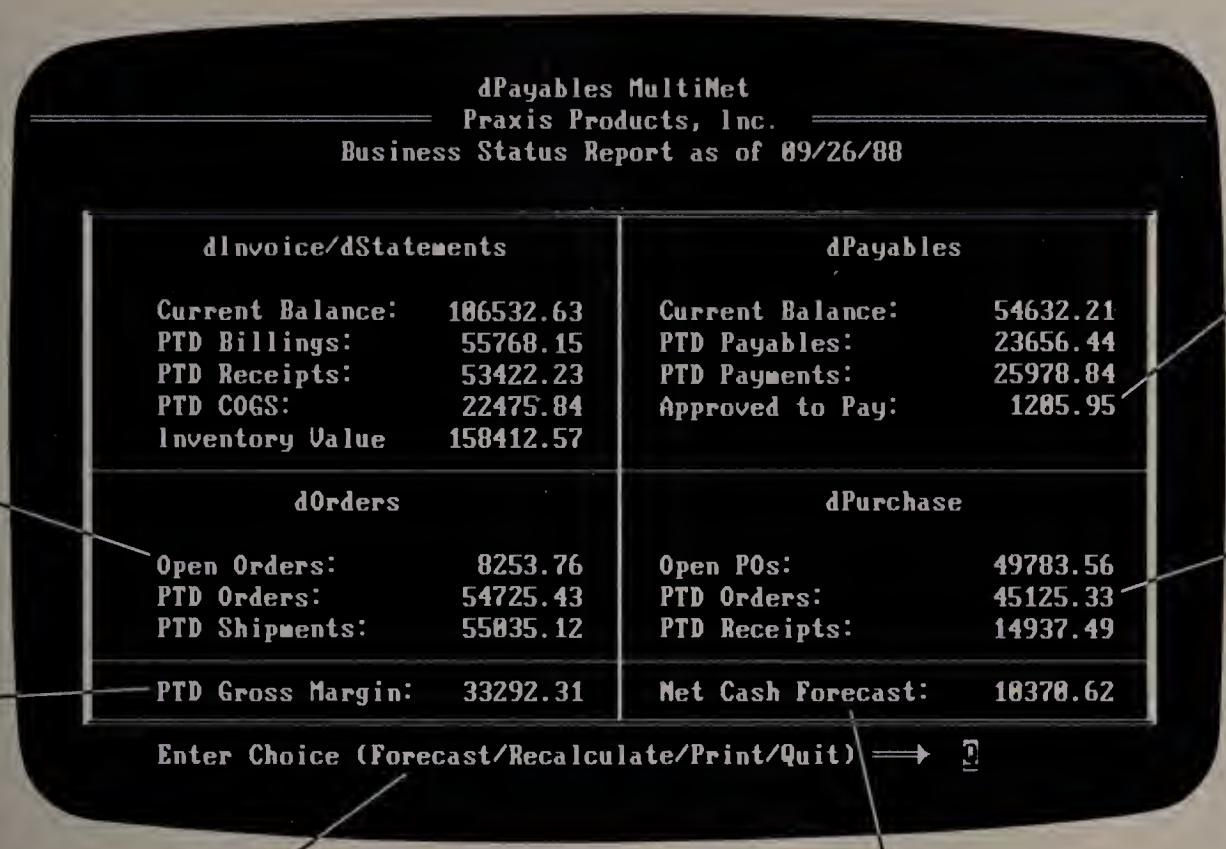
But Intel's powerful new i486 processor breaks that cycle and brings much greater functionality without abandoning its predecessor, the 80386. A more complete processor system than earlier designs, the i486 integrates many coprocessing enhancements formerly provided by discrete components at extra cost, enabling it to work two to four times as fast as the 386. Equally important, the i486 shows that the industry's prime CPU supplier has finally settled on a single processor platform.

In fact, the i486 should be seen as part of the 386 family rather than as a next-generation chip, points out Claude Leglise, marketing director. Based on a superset of the 386 architecture, it maintains complete binary compatibility with current applications written under DOS, OS/2, and UNIX. Like the 386, the i486 offers 32-bit memory addressability plus built-in capabilities to protect multiple applications from bumping into each other and to run multiple virtual 8086 machines.

Like the i860, Intel's recently announced Reduced Instruction Set Computer (RISC) chip, the i486 features next-generation silicon technology and houses 1.2 million transistors—compared to 275,000 on the 80386. Intel also has added an 8K read/write cache, an 82385-compatible cache

(continues on page 68)

It's 11:05am. If you had our accounting software, you'd know where your business is.



11:05
"Great, back orders are down. Now let's push those sales."

11:06
"Gross Margins look good. We can pick up sales volume with some promotions."

11:07
Let's forecast where these numbers will be at the end of the month."

11:08
"Last week's cash forecast was $4,000. We're looking much better. We can put some into CD's."

11:09
"Cash receipts are up, I can approve a few more P.O.'s."

11:10
"Purchase Orders are close to sales this month. I'll call Mary and put the brakes on any more P.O.'s for a while."

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Circle 259 on reader service card

Zenith

(continued)

route, it picked targets that became its strongholds: the Fortune 1000, colleges, and the federal government.

Quickly tackling corporate America with a direct sales force, "we garnered some fairly good market share right out of the gate," President John Frank says. When corporations began to buy systems complete with accessories like network adapters and tape backups, Zenith was ready to offer all those products and began shifting delivery to the dealer channel, which now handles almost all corporate customers.

In the federal arena, Zenith soon became the largest supplier of PCs, with well over 300,000 PCs sold to the Air Force. Early this year that contract expired, and Zenith expects its government business to drop in 1989 by more than $200 million, although it's bidding on the follow-up.

No PC supplier dominated college campuses when Zenith entered, and that segment has been very successful for the company. Not only do 12 million students attend U.S. colleges, each year a quarter of them are new students, remarks Andy Czernek, vice president for product marketing.

As it pushed into these markets, Zenith also chalked up some product firsts, ranging from a zero-wait-state PC to the first non-IBM VGA and OS/2 offerings. But its most striking achievements came in battery-powered laptops, whose crisp displays and clever power-saving tricks won shelf space at major computer chains and helped ZDS push up retail revenues 46 percent last year.

Andy Czernek and John Frank have guarded Zenith's strongholds in corporations, government, and colleges.

MICHAEL ABRAMSON

Laptop sales can only grow, Czernek declares. "By the year 2000, 80 percent of PCs will be battery powered—it's guaranteed." Low-power technology has advanced to the point that "we can run anything on 17 watts, so you get 3 hours of life from a 50-watt battery."

Zenith also is pushing into two other major niches. In February a work-group products venture kicked off with the Z-1000, a UNIX machine built on multiple 386 chips and aimed at network server and multiuser roles. And sales are growing for the patented flat tension mask (FTM) monitor, which Czernek calls "the only cost-effective way to get past 1024 by 768 resolution." FTM is also a key ingredient for the Zenith Electronics/AT&T cooperative venture for high-definition TV.

The last major U.S. TV manufacturer, Zenith Electronics has struggled for profits in recent years. "For five years, ZDS has been its salvation," says Merrill Lynch analyst Charles Ryan. But this year the consumer products group should post a modest profit. As for ZDS, with the dropping government sales, "they do have a challenge," Ryan remarks. But if Zenith holds on to its share of laptop and 386 sales, he says, those should compensate. —*Eric Bender*

IBM, Intel Jointly Push Multimedia Presentations

DVI Boards to Cost $1000 by 1991

Apple Computer has grabbed headlines with Macintosh multimedia applications, but PCs soon will offer a much more powerful and cost-effective presentation alternative. Digital Video Interactive, Intel's scheme for running multimedia applications, received a huge boost this spring when IBM agreed to jointly develop and market the technology.

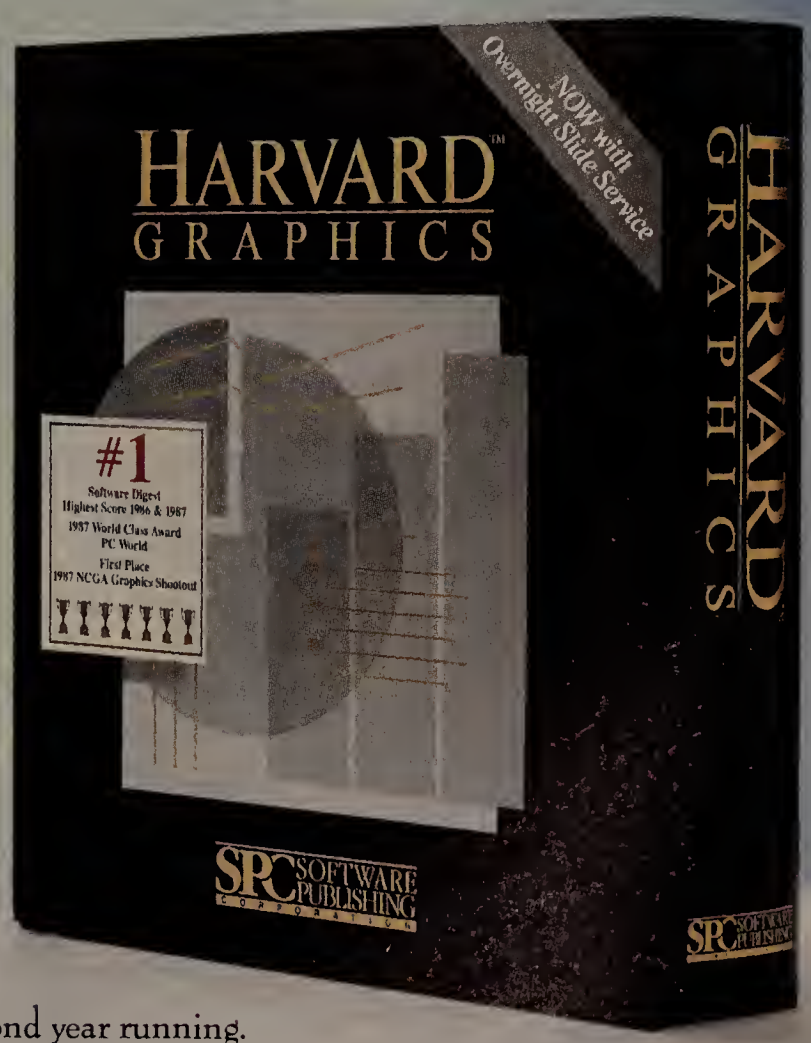
DVI will squeeze full-motion video (up to an hour of better-than-VCR quality), audio, images, and computer animation onto a CD ROM disk. An all-digital approach, DVI avoids the clumsiness inherent in trying to manipulate analog data (like video from a laser videodisk). And presentation will be cheaper because DVI doesn't require a separate video monitor.

This month Intel and IBM will ship a $21,500 development system that handles everything up to the final data-compression processing and creation of the CD disk. A corresponding presentation system will ship by year-end for something like $9000, estimates Bob Brannon, manager of Intel's DVI group in Princeton, New Jersey. Single-board versions for ATs and PS/2s are expected early next year. Pricing can't yet be estimated, because of volatile costs for video RAM chips. But a third round of silicon, available in boards in the second half of 1990, probably will drop add-in prices below $1000.

At the same time, the partners will polish and broaden a suite of development tools, says Terry

(continues next page)

A Few Words From The World's Most Celebrated Graphics Software.



Thank you. For those of you who haven't heard, Harvard Graphics from Software Publishing has gotten a lot of recognition from the trade press. Why, you may ask? Certainly our crisp, high-speed output helped influence InfoWorld readers to name us Product of the Year. And the easy access to so many chart and graphing options must have helped PC World's audience give us their World Class Award for the second year running.

Actually it must have been all those things and more. Otherwise why would PC Magazine call Harvard Graphics "the de facto standard" software for business graphics?

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DVI Boards

(continued)

Rogers, IBM multimedia product development director in White Plains, New York. These will range from hardware device drivers to an easy-to-use authoring environment designed "to give a relatively simple, preferably graphical metaphor for organizing a presentation, then give access to the various levels of video and audio clips," Rogers says. The environment's all-digital flexibility will streamline the creation of interactive applications.

Currently DVI runs under DOS, but the technology is likely to extend to OS/2 and UNIX within two years. Additionally, IBM and Microsoft have announced cooperative work on multimedia, starting with a CD ROM audio standard and evolving to an integrated DVI environment.

Despite IBM's leading role, "DVI will be a commodity product, and everyone will get a shot at it," Brannon says. But will it dominate desktop multimedia?

Apple hasn't disclosed any plans for digital multimedia and seems to be waiting for erasable CD ROM, high-speed fiber-optic communications, and other forms of technical support to take hold before building an integrated networked multimedia computer, adds Brannon. However, that may delay commercialization until the mid-1990s.

Another contender is Compact Disk Interactive (CD-I), but Philips and Sony bypassed the PC and "purposefully backed themselves into a corner," Brannon says. "From the PC point of view, it's not a competing technology."

Digital Video Interactive applications like DuPont's truck-driver simulator can exploit full-motion video.

While workstations from Next and Sun tout their multimedia capabilities, Brannon points out that "they're not aimed at video, and video-signal processing is a very special field." Greater competition may loom from Japanese electronics giants.

But multimedia demands not just a host of tricky technical components but also a balanced way to combine them. "If you successfully develop a super compression algorithm but don't have all the support pieces, it's not much use," Brannon says. "DVI will have the playing field to itself for the next 24 to 36 months.

"Application developers will charge down the obvious paths—business training, simulation, point of sale," Brannon suggests. "But somebody's going to think of something really clever, à la *VisiCalc*, and we're all going to say, 'Why didn't we think of that?'" —*Eric Bender*

Intel

(continued from page 64)

controller, a paging memory-management unit, and a floating-point coprocessor that's compatible with the 80387 math coprocessor. Putting these formerly discrete components on board reduces the lag involved with interchip communications. And, depending on the application, on-chip caching eliminates the processor's need to go to external memory 95 percent of the time.

The i486 also incorporates RISC techniques for commonly used instructions, which therefore execute more quickly than on 386 and 387 processors. For example, on the 386, a load operation takes four clock cycles and a store takes two, while either instruction requires only one tick on the i486. Leglise maintains that the i486 can match the Sun Microsystems SPARC or Motorola 88000 RISC chip running at the same speed.

Additionally, the i486 is optimized for managing multiple application "threads" from multiple processors, boosting multiprocessor machines like Zenith's Z-1000 UNIX box. OS/2 doesn't yet support this kind of multiprocessing. But Michael Slater, editor of the *Microprocessor Report*, expects to see suitable i486-specific OS/2 and *Windows* implementations in the not-too-distant future.

Despite these additions, the i486 can be easily integrated into 386 systems. Once a prototype chip arrived, "we had it up and running within 3 hours," says James Cannavino, head of IBM's Entry Systems Division.

With system prices expected to start between $10,000 and $15,000, the i486 won't be for everyone. Of course, that's what we heard when the 286 and 386 appeared, and they penetrated the market with striking speed. But the i486 is likely to settle in at a slower pace, if only because Intel now offers 32-bit processors for most budgets—including the low-end 386SX and a range of 386 models. And software vendors have been slow to exploit 32-bit systems. —*Mike Hogan*

Eric Brown is a PC World *associate editor, and Mike Hogan is* PC World's *news editor.* ●

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That Harris doesn't scare me! I am without fear; I possess nerves of steel.
Mr. Quigley – Mr. Harris will see you now.
courage, Quig ol' boy... courage
CREAK
So, Quigley!! You want a raise, do you!!
BLAST
CRACKLE
CLASSIFIED AREA
Well, I, uh (stutter)... um, uh, um... I mean, er, uh, er ...
SILENCE!! Do you really believe your extended breaks and paltry work efforts rate a salary increase?!!
CLICK
CLICK
Oh, I wish I was back in Kansas. There's no place like home
GO NOW!! I HAVE SPOKEN!!!
CLASSIFIED AREA
Not bad. Not bad at all
Ms. Verner — send in the guy with no brain.

MARK MAREK

We Interrupt T War For This Im

To all those unlucky enough to be stuck smack in the middle of the current spreadsheet confusion, take heart.

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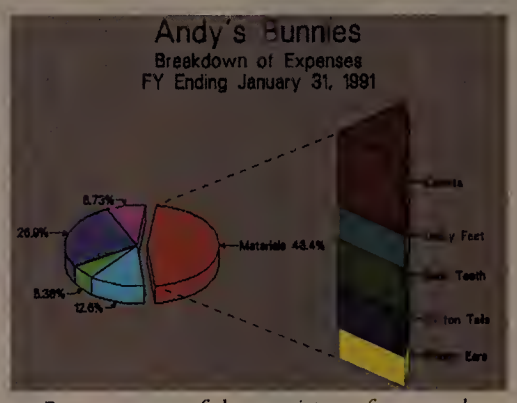
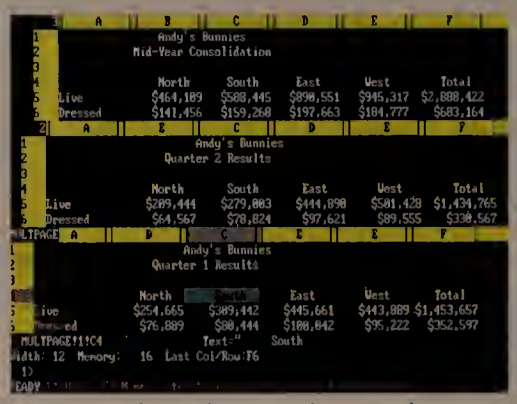


Present a state-of-the-art picture of your work.



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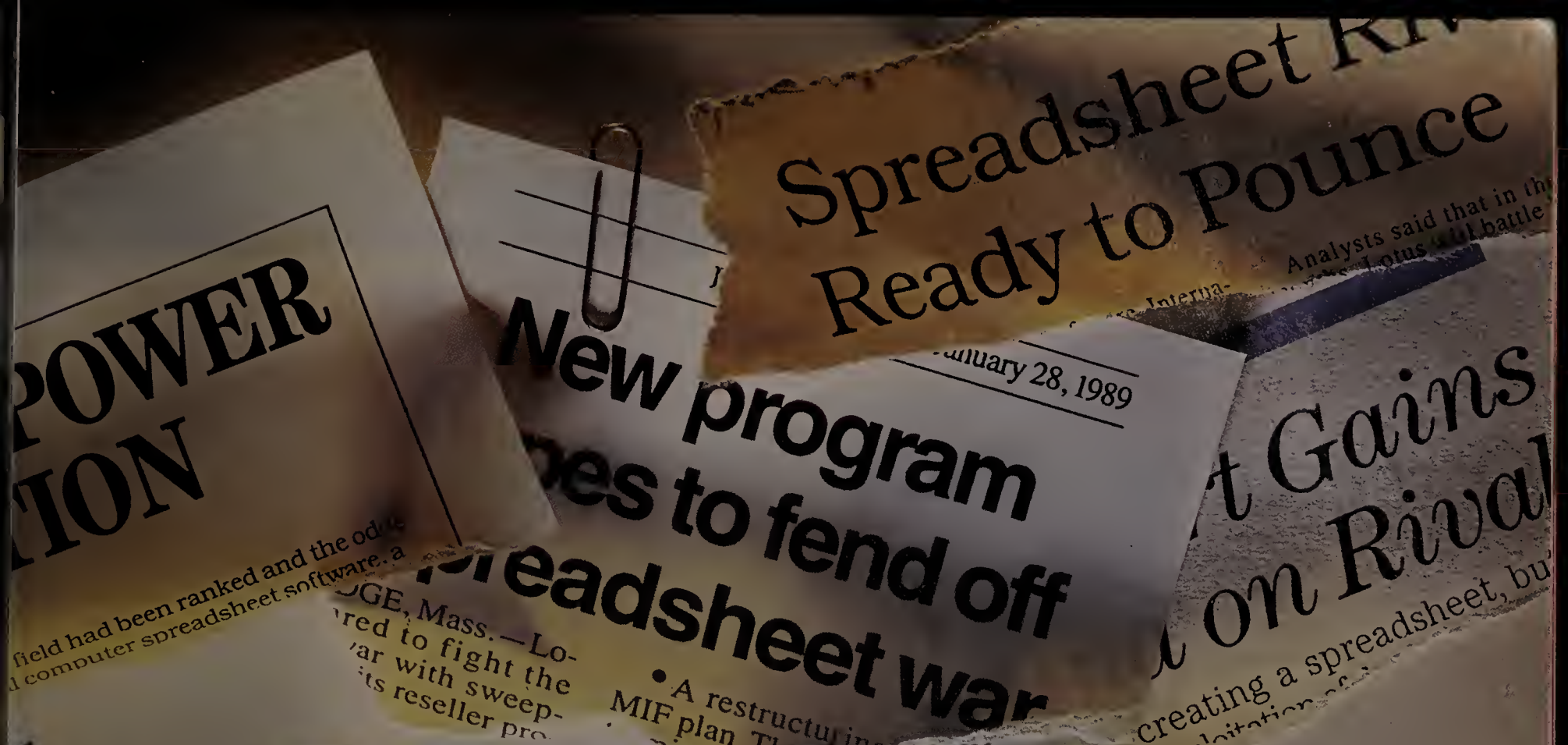

he Spreadsheet portant Update.

to be precise. Linking either in memory or on disk, either pages of the same spreadsheet or independent, either SuperCalc5's files or Lotus® 1-2-3®'s.

Andy's Bunnies
A Division of Hare, Inc.
Income Statement
FY Ending January 31, 1991
Unaudited

	This Year	Last Year
Revenue:		
Sales		
Live	$5,778,453	$4,080,672
Dressed	$1,444,775	$677,113
Sales Discounts	($434,990)	($479,124)
Rent-a-Rabbit Fees	$679,991	$924,587
	$7,468,229	$4,812,318
Cost of Sales		
Opening Inventory	$9,662,351	$5,676,712
Purchases	$109,814	$4,229,164
Freight in	$56,727	$43,242
	$9,828,892	$9,949,118
Ending Inventory	$7,334,110	$9,662,351
Cost of materials	$2,494,782	$286,767
Direct labor	$1,447,951	$1,677,243
Employee benefits	$289,590	$335,449
Ranch supplies	$679,444	$610,442
Total Cost of Sales	$4,911,767	$2,909,901
Gross Profit	$2,556,462	$1,702,317
Less selling, general and admin expenses	$469,887	$490,774
Earnings (loss) from operations	$2,086,575	$1,211,543
Other income and expense:		
Interest income	$11,309	$9,765
Other income	$17,899	$15,666
Gain (loss) on sale of fixed assets	($379)	$0
	$28,829	$25,431
Provision for income taxes		
Current income taxes	$1,043,287	$605,772
Deferred income taxes	$0	$0
	$1,043,287	$605,772
Net earnings (loss) for period	$1,043,287	$605,772

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Circle 246 on reader service card

Pascal Gets Two Object Lessons

Borland's updated Turbo Pascal squares off against a new contender—

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Tom Swan
and
Scott Spanbauer

More powerful than BASIC but easier to grasp than C, Pascal is the foundation of structured programming curricula the world over. For years, Borland's *Turbo Pascal* went unopposed in the low-cost Pascal programming arena, gathering a large and loyal following. Recently a challenger arrived, Microsoft's *QuickPascal 1.0*. But the fight won't be easy: *Turbo Pascal 5.5*, which appeared shortly after *QuickPascal*, may safeguard Borland's crown.

A prerelease version of *QuickPascal* contains object-oriented extensions to the Pascal language and an interface that permits multiple, overlapping, mouse-aware windows, but it also shows some omissions. An advance copy of *Turbo Pascal 5.5* exhibits solid new muscle for power programmers, including practical object-oriented extensions.

Both products target beginning programmers with easy-to-use integrated environments. Both let you compile from the integrated environment or the command line, include built-in debuggers and extensive online help, and provide printed and disk-based tutorials.

OOPascal: Different Strokes

Pascal programmers will be most excited by the compilers' object-oriented extensions. The popularization of object-oriented programming (OOP), much like that of structured programming in the early 1970s, promises to help developers cope with increasingly complex software demands (see "The Object Is Software De-

PC World previews are informal assessments of products that at press time were still in the development stage. Complete reviews—including features evaluations and performance testing—will appear only after a product is officially released.

SNAPSHOT

QuickPascal 1.0

Microsoft's newest language directly challenges Borland's flagship compiler.

KEY FEATURES

- **Object-oriented features for advanced programming**
- **Near-complete compatibility with *Turbo Pascal 4.0* and *5.0***
- **Multiwindow editor, mouse-literate interface**
- **Built-in debugger**

AVAILABILITY

Immediate

PRICING

$99

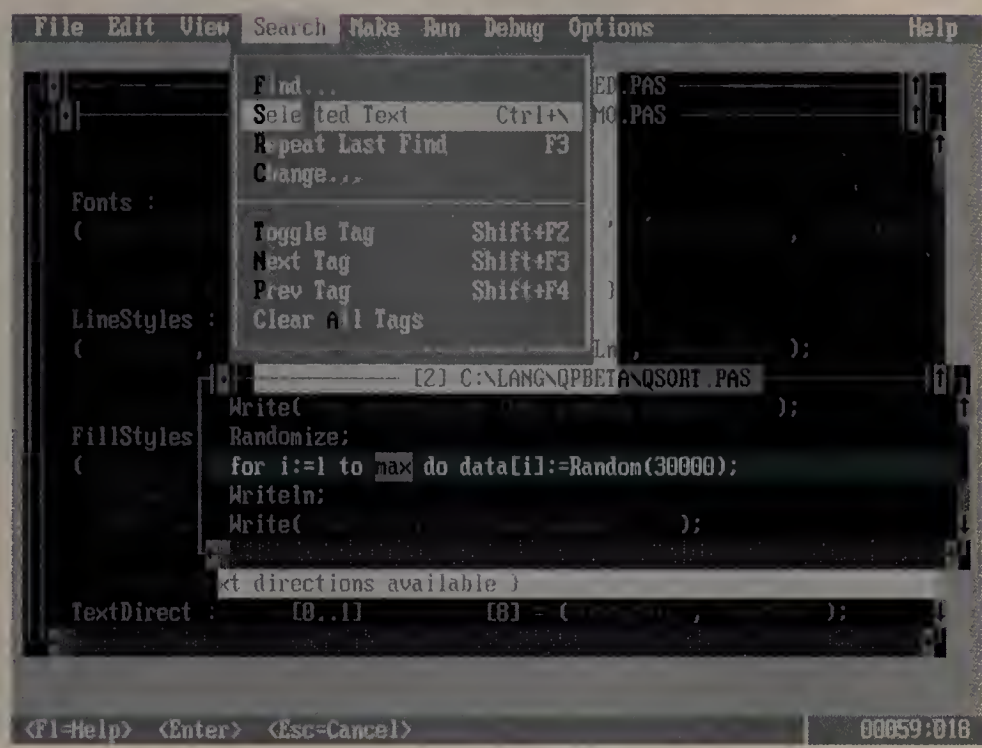
Microsoft Corp.
16011 N.E. 36th Way
Box 97017
Redmond, WA
98073-9717
206/882-8080

Reader service no. 760

sign" in "Special Report: Languages," *PCW*, April 1989).

But despite a superficial similarity, the compilers differ radically in how they implement objects. *QuickPascal*'s object-oriented extensions are patterned after Apple's Object Pascal, in which all objects are addressed by pointers and are created and destroyed using the New and Dispose procedures. This means that *QuickPascal* objects employ *virtual*, as opposed to *static*, methods (the procedures and functions that objects know how to perform). Virtual methods are a powerful cornerstone of OOP, but they require more memory and can reduce program speed.

Turbo Pascal 5.5 takes a different path, borrowing concepts from another popular object-oriented language, C++. You can employ virtual methods, static methods, or a combination of the two. New *constructor* and *destructor* methods automate virtual-method housekeeping chores. Replacing inherited methods with local versions doesn't require Object Pascal's OVERRIDE keyword, and static methods can have parameter lists different from their ancestors'. In addition, objects may be created as variables or addressed by pointers with the help of extended versions of New and Dispose.



One of QuickPascal's strong points is an enhanced version of the Microsoft Works interface that lets you cut and paste code between multiple windows using a mouse.

SNAPSHOT

Turbo Pascal 5.5

More powerful than ever, *Turbo Pascal* sets the stage for the object-oriented future.

KEY FEATURES

- **Object-oriented features for advanced programming**
- **Faster compilation, improved overlay memory manager and linker**
- **Built-in object-oriented debugger**

AVAILABILITY

Immediate

PRICING

$149.95; upgrade from version 5.0 $34.95, from version 4.0 $75

Borland Int'l
1800 Green Hills Rd.,
P.O. Box 660001
Scotts Valley, CA 95066
408/438-8400

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QuickPascal: Compatibility Concerns

Microsoft's upstart compiler beckons to the legions of *Turbo Pascal* programmers with a promise of compatibility. But while *QuickPascal* easily handles most *Turbo Pascal* commands, some pitfalls remain. *QuickPascal* lacks a unit (submodule) overlay manager for swapping program segments in from disk—a prized feature of *Turbo Pascal 5.0* and *5.5*. Moreover, the beta compiler balks when more than two units refer to each other in circular fashion, and it can't execute Borland Graphics Interface (BGI) routines on some EGA adapters. Microsoft claims that those last two limitations will be overcome in the shipping version.

To its credit, *QuickPascal* offers a well-designed, mouse-aware interface that allows nine tiled or overlapping windows. The reprogrammable text editor highlights Pascal keywords as you type them, but unlike *QuickBASIC*'s editor, it doesn't check syntax.

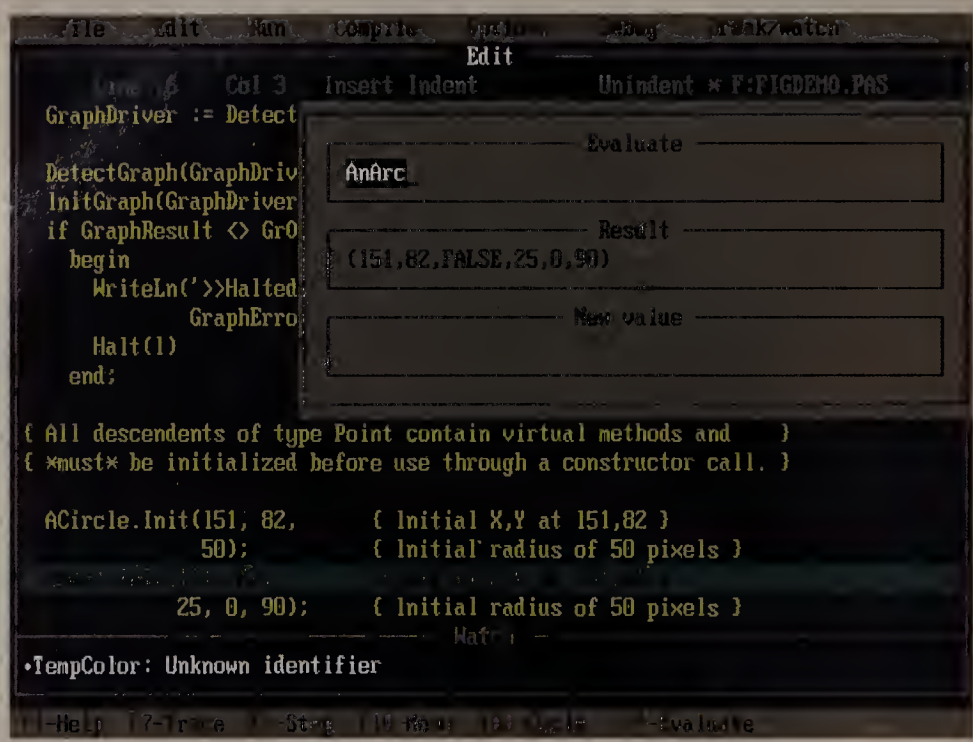
Polishing Turbo Pascal

Besides OOP, several features set *Turbo Pascal 5.5* apart from previous versions and make the upgrade worthwhile even to the OOP-indifferent. An improved overlay memory manager can now be fine-tuned to improve performance, and the smart linker can strip unused

methods from objects while deleting unreferenced code from compiled output. Compiler output speed is boosted by 10 percent over previous versions.

As good as it is, *Turbo Pascal* still isn't perfect. Limited to opening one mouseless window at a time, its once innovative interface seems in danger of slipping behind the times.

Both Borland's upgraded *Turbo Debugger 1.5* and *Turbo Pascal*'s built-in debugger now recognize object ancestor-descendant relationships and can inspect object hierarchies. By contrast, Microsoft's *CodeView* debugger can't debug *QuickPascal* code.



Unchanged on the surface, Turbo Pascal 5.5 is packed with extra speed, an improved overlay manager, and a built-in object-oriented debugger.

So overall, despite *QuickPascal*'s object-oriented extensions and well-designed interface, the prompt appearance of *Turbo Pascal 5.5* will preclude a technical knockout in the first round. ●

Tom Swan edits PC World's *Star-Dot-Star column and wrote* Mastering Turbo Pascal 4.0 *(Howard W. Sams, Indianapolis, 1988) and* Mastering Turbo Assembler *(Howard W. Sams, 1989). Scott Spanbauer is a* PC World *assistant editor.*

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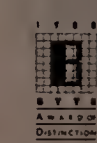

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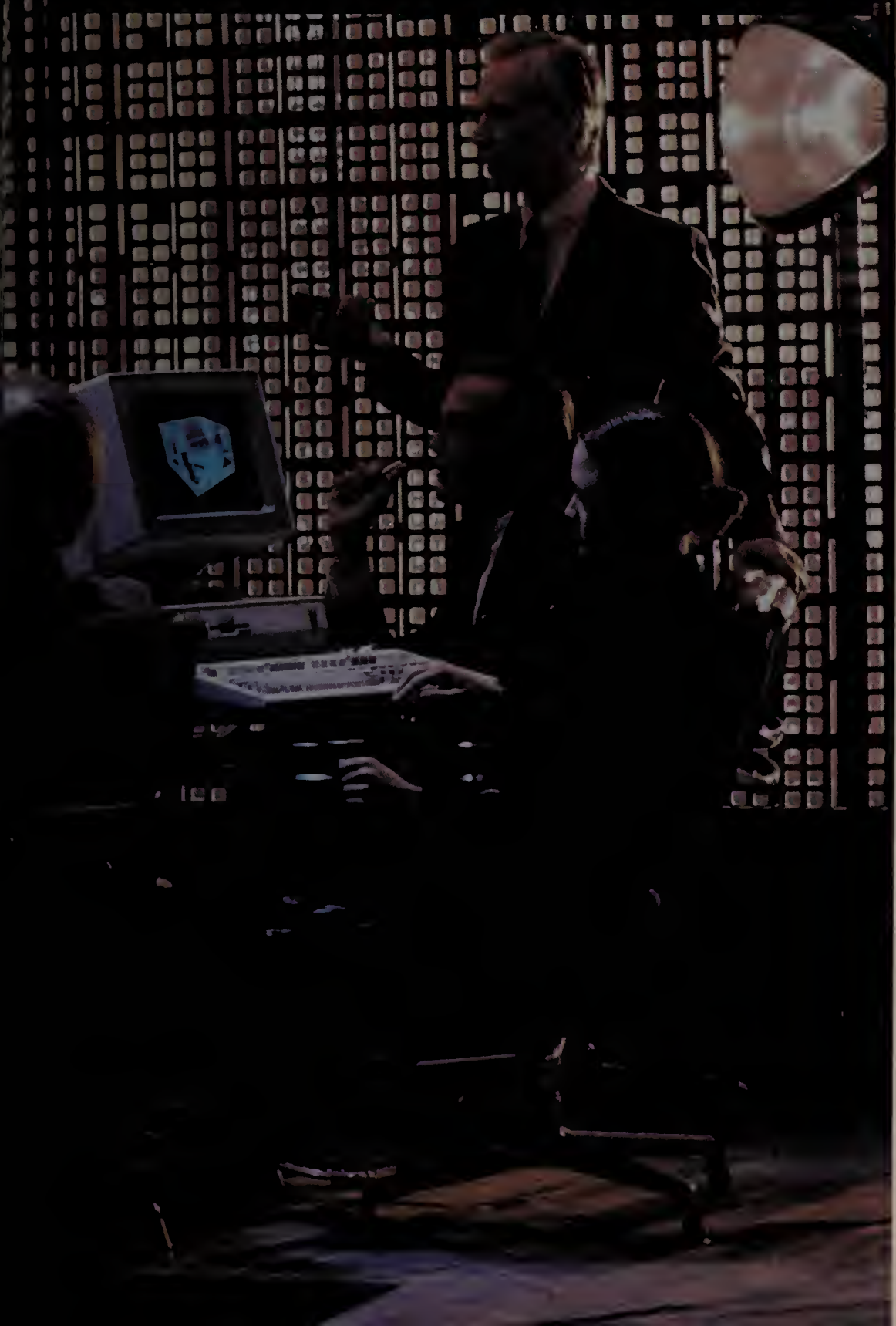

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PRODUCT OUTLOOK

INSIDE PRODUCT OUTLOOK

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A heavy-duty system for big jobs, the Z-386/25 lays on the 32-bit memory, packs plenty of slots, and displays top-notch VGA video.

79 **Profitwise Basic Accounting**
Balance your books on the cheap with this streamlined version of *Solomon III.*

80 **DaynaNet**
You don't have to empty your coffers for a server-based LAN—*DaynaNet* links 100 Mac and PC users and stores their files centrally.

82 **MicroFrame 386CT**
Perk up your AT with a 386 add-in motherboard that holds up to 8MB of 32-bit memory.

82 **Arriba**
A simple personal information manager that sorts the flotsam from the jetsam.

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86 **PrintRite**
Spool files to disk and set up a laptop print queue even on an airplane, then print in the background when you touch down.

88 **Laser-Ready**
Produce forms, newsletters, and more on your laser with this utility's ready-made templates.

88 **Up Your Cash Flow**
A plain-vanilla spreadsheet geared to everyday calculations.

90 **AutoImport**
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90 **Network Eye**
A remote-control capability lets authorized users fine-tune the processing activities of up to 100 networked PCs for maximum efficiency.

UPDATE

90 **Pizazz Plus**
You get easy, menu-driven screen capture plus support for scads of display adapters and printers without having to mess with control codes.

92 **Readability Plus**
This style checker analyzes your writing in the context of its genre—tech writing, press releases, and so on.

Zenith Z-386/25

Lighting a Fire Under Your Desktop Applications

A 25-MHz 80386 processor is just the fire starter. If you want to blaze through CAD, multitasking, or multiuser applications, you'll also need plenty of 32-bit memory, high-performance memory caching, and a disk controller that won't dampen the fire. While you're at it, you might as well stoke the system with top-notch VGA video and a multitasking environment.

You could pull all this together by yourself, but Zenith's Z-386/25 does it for you. It ships with a minimum of 2MB of 32-bit memory on the motherboard, and you can add up to 8MB via 1MB memory modules, with another 24MB on the 32-bit memory bus.

Zenith's Superset Bus includes a generous complement of four 8/16/32-bit slots and three 8/16-bit slots. One 8/16-bit slot is devoted to the hard/floppy ESDI disk controller and another to video, and one 8/16/32-bit slot takes a special board with a system control processor, I/O controller, battery, and setup ROM. You can use any or all of the three remaining 8/16/32-bit slots for CPU-speed memory, putting up to 8MB of 2MB SIMMs in each for a system total of 32MB.

You'll be able to use 4MB memory modules when they become available, says Zenith. You can also use the Superset slots for 25-MHz 32-bit memory or for other standard PC or AT cards running at 8 MHz. The Z-386/25 automatically adjusts I/O bus timing depending on whether there's a fast memory card or a slow peripheral card in a slot.

Performance gets a boost from 16K of 25ns zero-wait-state cache memory that employs a 16-level write technique (which writes 64 bytes before you incur a wait state). Naturally, you'll need a disk drive that can keep pace with such fast company. Zenith includes ESDI drives with all its models, boasting a 10-mbps rate, average access times under 16ms, and 1:1 interleave controllers.

The controller can run two hard and two floppy drives. A 1.44MB, 3½-inch floppy comes standard, with room for three more 5¼- or 3 ½-inch half-height devices in the bays. You also get a socket for either an Intel 80387 or a Weitek coprocessor. Also standard: one parallel and two serial ports, a 101-key

(continues)

Zenith's Z-386/25 offers up to 32MB of 32-bit memory, 16K of 25ns cache, and a choice of fast ESDI drives with 1:1 interleave controllers for your biggest computing jobs.

Profitwise Basic Accounting

Four-Star Accounting Features—Affordable and Upgradable

In the days before Dac Software stormed the market with *DacEasy* at a what-have-you-got-to-lose price, accounting software required a much bigger commitment in dollars and time. Now it seems that everyone has a budget accountant, the latest being *Profitwise Basic Accounting*. It's a scaled-down version of TLB's *Solomon III*, which could run you more than $10,000 complete with all modules.

The $229 *Profitwise* competes directly with *DacEasy BonusPack* and *Peachtree Complete II*, both $199. Modules include general ledger, payroll, accounts payable, accounts receivable, invoicing, fixed assets, and an address list manager for the other modules. Also available in the *Profitwise* series for $229 each are a report and graph-designer module and an inventory and job-costing module.

Profitwise offers an easy upgrade path to *Solomon III* with little additional training required, no need for file conversion, and a comparable password-protection scheme so that you can manage employee access to its menus on a need-to-know basis. *Profitwise* audit trails are also superior to those in other entry-level systems. Its logfile feature, which logs all keystrokes since the last backup, could be a life-saver. (In the event of a system failure, *Profitwise* can reconstruct the data

(continues)

DaynaNet

Low-Cost LANs—Now You Can Have Your Server and Afford It, Too

Wherever PCs talk, so does money. And PC users have gotten the word that distributed networks like *TOPS* (which don't require a dedicated PC for a file server) enjoy a cost advantage over most server-based local area nets. But Dayna Communications argues that a LAN doesn't have to be distributed to be inexpensive, and its *DaynaNet* operating system makes a good case for a server-based, entry-level net solution.

Dayna helped Novell add Macintosh support to *NetWare*, and *DaynaNet* looks very much like a trimmed-down version of *NetWare*, with many of the features of the popular and costlier Novell product. But along with the lower price comes a shorter list of supported network topologies. *DaynaNet* is tailored specifically for low-speed Apple LocalTalk, Farallon PhoneNet, and compatible nets, although it also accepts ethernet hookups.

One of its biggest advantages over distributed nets is centralized file storage, which eliminates that nagging problem of files being out of reach when the machine on which they are stored is turned off or otherwise occupied. Dayna claims that you get better performance from your own computer with *DaynaNet* thanks to print spooling and queuing. And you can jump past LocalTalk's standard 230-kbps data transfer rate to 1.7 mbps on the PC and 850 kbps on the Mac if you buy Dayna's DaynaTalk accelerator cards, which cost $289 for the PC and $189 for the Mac.

Each AT file server outfitted with a Dayna-

(continues)

DaynaNet combines the central file management convenience of a server-based net with the low price typical of distributed networks.

Profitwise

(continued)

base to the point of failure using the last backup and the current logfile.)

Like *Solomon III*, *Profitwise* can print any report to disk that it can print to a printer, allowing you to use a spreadsheet to report and analyze data generated by *Profitwise* (although it can't import spreadsheet data). And the program has a high-end look and feel, with conveniences like the ability to reference all general ledger account numbers and their definitions with a function key whenever you enter data.

But on the other side of the ledger, it seems as though TLB balked at making *Profitwise* too powerful for fear it might compete against its flagship, *Solomon III*. The former's limit of 10 departmental subaccounts seems arbitrary when compared to *Peachtree*'s 99 and *Solomon III*'s unlimited number. *Profitwise* allows just 10 user-defined reports in its General Ledger module, while *Peachtree* and *Solomon III* have no limits. And *Profitwise* limits total data base size to 4MB, while *DacEasy*, *Peachtree*, and *Solomon III* are limited only by hard disk capacity.

It would be nice to have a purchasing module, which *DacEasy* contains and which many companies will miss. Worse, you can't enter paid invoices in one operation, a capability *Solomon III*, *Peachtree*, *DacEasy*, and others provide. Instead, you must enter paid invoices in accounts payable and then "pay" these invoices by printing checks on plain paper, needlessly complicating a simple and frequent activity.

At $687 for all the modules, *Profitwise* is roughly twice the price of a comparably configured Dac or Peachtree system. But on the whole, it offers a higher level of functionality. For example, the *Profitwise* general ledger allows you to post adjustments to both prior and future periods, a feature the others lack.

The accounting system requires DOS 3.1 or a later version, 640K, and a hard disk with 10MB free. TLB Inc., 1218 Commerce Pkwy., P.O. Box 414, Findlay, OH 45839; 800/777-0521, 419/424-0422. —*Charles Kyd*

Reader service no. 731

Zenith Z-386/25

(continued)

keyboard, a hefty 200-watt power supply, and an enhanced version of Zenith DOS 3.3 Plus.

The $6599 Model 1 comes with a single floppy and no video card but includes Zenith's *Slushware* video helper.

ESDI drive–equipped models include the $8999 Model 70 and the $9999 Model 150 with 18ms 70MB and 16ms 150MB drives, respectively. The $11,999 Model 320 has a 14ms 320MB ESDI drive. All come with a Z-549 16-bit VGA card and *Microsoft Windows/386*. (The Z-549 normally retails for $599.) Zenith Data Systems, 1000 Milwaukee Ave., Glenview, IL 60025; 800/842-9000. —*Mark Henricks*

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MicroFrame 386CT

A 386 You Can Build for Yourself

Tired of waiting for your AT to crawl through desktop publishing projects or massage mega-worksheets and data bases? The MicroFrame 386CT cuts out wait states and gives top PC performance sans the cost of an 80386 machine—if you don't mind transplanting a motherboard.

The 386CT is a 32-bit AT motherboard replacement that you can buy with a 20-MHz or 25-MHz Intel 80386 processor and 1MB to 8MB of zero-wait-state memory. A Chips and Technologies 82C307 cache/memory controller is standard. Like many other 386 motherboards, the 386CT has separate 32-bit memory and input/output buses, enabling memory cards in the two 32-bit slots to run full tilt at the CPU's clock speed while the expansion bus's six 8/16-bit slots keep a steady pace with standard 8-MHz peripherals. If your boards are designed for faster speeds, the programmable expansion slots handle up to 10 MHz with the 20-MHz processor, and 12.5 MHz with the 25-MHz chip. You also can use one or both of the 32-bit slots for AT-compatible boards.

The MicroFrame 386CT has a few other speed tricks up its sleeve. A 32K static RAM cache beefs up system performance by reducing the time needed for memory access and code execution.

The MicroFrame 386CT comes tailor-made for a standard AT chassis, but its baby-AT form factor (8½ by 13 inches) also makes it suitable for small-footprint ATs, portables, and some laptop models. Other features include an on-board clock/calendar and a socket for either the Intel 80387 or the Weitek 3167 math coprocessor.

The MicroFrame 386CT 25-MHz motherboard with 1MB of 32-bit RAM lists for $2825. The 20-MHz 386CT with 1MB of 32-bit RAM costs $2295. Monolithic Systems, 7050 S. Tucson Way, Englewood, CO 80112; 303/790-7400. —*Wes Nihei*

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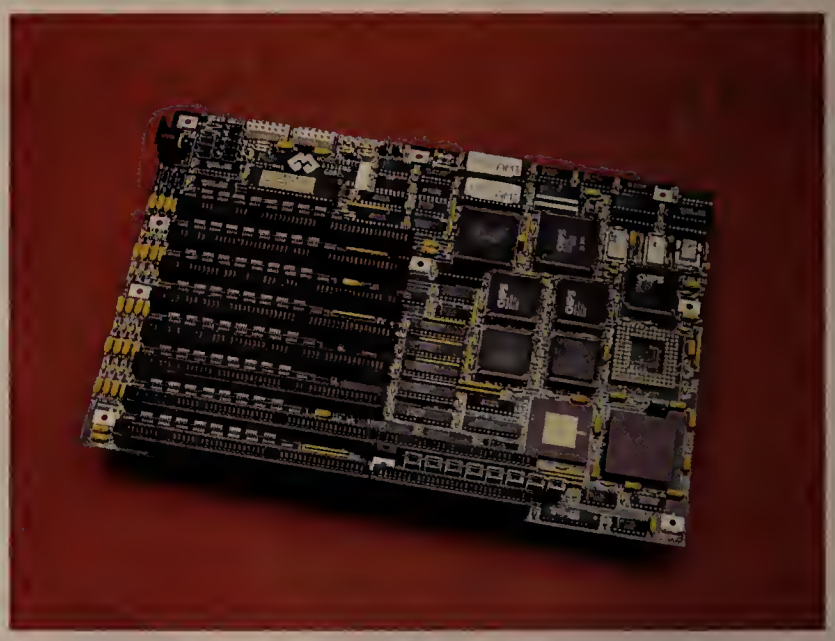

The MicroFrame 386CT motherboard turns an AT into a zero-wait-state 386 with a choice of processor speed, memory, and expansion options.

DaynaNet

(continued)

Talk card can serve 100 users concurrently. Work groups can comprise any mix of PCs and Macintoshes and can share files transparently, but you need at least one Mac on the network to set it up and run utilities. Eight levels of security ensure that users access only the proper files.

The suggested retail price for the operating system is $1249, including a DaynaTalk card for the AT file server. Each server may contain four DaynaTalk cards and serve four nets. Dayna Communications Inc., 50 S. Main St., Salt Lake City, UT 84144; 801/531-0600. —*Mark Henricks*

Reader service no. 732

Arriba

Midlevel Information Manager

A lot of us live somewhere between *MemoryMate* and Lotus's *Agenda*. We have more notes, appointments, and projects than a simple organizer like *MemoryMate* can handle. But we hesitate to take the time required to master a full-fledged personal information manager (PIM).

Arriba lives where we do. This midlevel PIM from Good Software gives up some of *Agenda*'s more intelligent attributes while providing ready-made applications to get you started quickly.

The program organizes data by folders, which contain groups of notes or sometimes more folders. You can enter information as free-form text; at other times you'll find *Arriba*'s customizable forms handy for entering information like phone numbers. You retrieve data with a simple text search that displays a list of notes and

(continues)

```
F1=Help   F2=Mark F3=Paste        F7=Date F8=Time          F9=Save   F10=New

        ABC Industries          |(412)555-1255 |    |Steve Davidson
Business: ABC Industries
Address:  100 Main Street
City:     Pittsburgh            State: PA     Zip: 15201

Phone:    (412)555-125   Ext:

Contact:   Steve Davidson
Title:     Controller
Secretary: Tammy

Recall Date: 5/15/89                    Last Reached: 5/1/89
Last Contact Results: Send proposal, followup 5/15

Next Step:      Followup                  Activity Status:
Referred By:
Next Objective: Order                     Probability: 85%

Business Class: Manufacturing
Contact Class:
Assigned To:

Note:   Edit                Insert                Line:   1 of  20 Col: 1
```

Arriba gives up some high-end PIM attributes but flattens your learning curve by providing ready-mode, customizable forms.

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ProCollection, Type Director

LaserJet Fonts—Desktop Publishing From Easy to Elegant

Hewlett-Packard has unleashed a flurry of fonts for its LaserJet printers, in both cartridge and soft font form.

Fonts from several popular packages have been consolidated into a cartridge that Hewlett-Packard calls the ProCollection. Compatible with all LaserJet printers, the $300 ProCollection is for those with basic office printing needs who don't want to get into downloading soft fonts or swapping font cartridges. The cartridge contains 65 commonly used fixed-pitch and proportional fonts in both landscape and portrait modes. Font families culled from HP's cartridge catalog include Courier, Prestige Elite, Letter Gothic, Line Printer, TmsRmn, and Helv in point sizes from 3.6 to 14.

Additionally, HP joined forces with typesetting heavyweight Agfa Compugraphic to expand its soft-font family via *Type Director*, a menu-driven utility that creates scalable typefaces for LaserJet printers.

If you have the time and inclination to thoroughly polish your output, you can tap *Type Director* and get PostScript printer–like font flexibility without the investment in hardware. Based on Compugraphic's Intellifont scaling technology, *Type Director* lets you scale typefaces from 4 point (1/16 inch) to 200 point (2 inches) in half-point increments and then create and download soft fonts to all LaserJet printers that accept them—the LaserJet Plus, 500 Plus, Series II, and Series IID. *Type Director* also provides an on-line tutorial and help screens.

In addition to printer fonts, *Type Director* generates screen fonts to support WYSIWYG features of software programs such as *PageMaker* and *Ventura Publisher.*

Currently three soft font sets are available from HP: CG Times and Univers 1 come in regular, bold, italic, and bold italic styles; the third set, Decorative 1, includes Brush, Uncial, Dom Casual, and Park Avenue. Each typeface contains 585 characters that can be combined into 14 different symbol sets for English and European-language special character needs. HP plans to make more of Compugraphic's extensive typeface library available in future releases.

You may already enjoy an extensive soft font library; *Type Director* lets you mix and match its fonts with all HP soft fonts and those from Bitstream's *Fontware.* Currently, *Microsoft Word* *(continues)*

Mannesmann Tally MT905, MT81

Two Printers, Two Solutions

Laser printing at the office for under $2000, and near letter quality printing at home for under $200: Pick one from column A, one from column B, or at those prices, buy them both. Mannesmann Tally has found a way to satisfy your appetite for clean-looking copy wherever you're working, without taking too large a bite out of your budget.

At the office, the company hopes to divert first-time laser printer buyers away from the Hewlett-Packard LaserJet Series II with its MT905, which offers all the LaserJet's features for about $700 less than the HP's $2695 price. At 35 pounds and 16.1 by 8.3 by 15.4 inches, the MT905 is smaller and lighter than the LaserJet, but you'll give up speed because the MT905 prints at 6 ppm (rather than the LaserJet's 8 ppm).

Mannesmann Tally's 6-ppm MT905 offers the features of an HP LaserJet Series II—for about $700 less. The MT81 is a light-duty dot matrix unit that produces near letter quality output for only $199.

Features designed to save even more time and money include separate drum and toner components. When either component wears out, it can be replaced; most other *(continues)*

Arriba

(continued)

folders containing a keyword or phrase. If you prefer, you can generate an outline of notes and folders. If you still haven't found what you need, you can browse through all notes and folders.

Arriba can't automatically index material by preselected keywords, as *Agenda* does. Nor can it translate terms like *tomorrow* into the proper date, as *Agenda*'s intelligent scheduler can.

What you do get, though, are built-in applications for handling to-do lists, expense accounts, appointments, and phone numbers (including an auto-dialer). You create custom applications with a menu-driven forms builder.

Priced at $195, *Arriba* requires DOS 2.0 or a later version and a hard disk. It runs in 200K when memory resident and in 384K as a standalone. Good Software Corp., 13601 Preston Rd. 500W, Dallas, TX 75240; 800/272-4663. —*Mark Henricks*

Reader service no. 734

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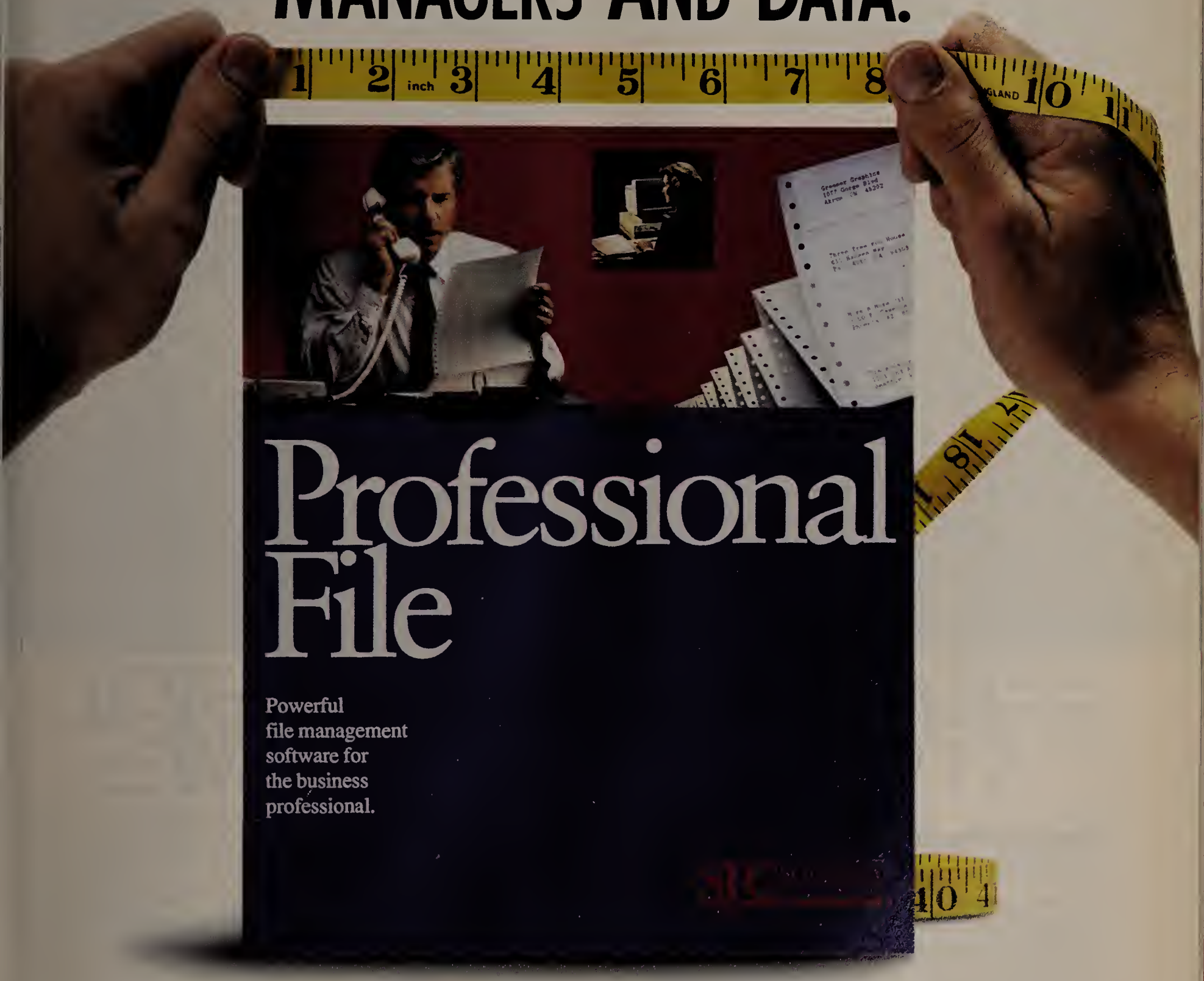

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PrintRite

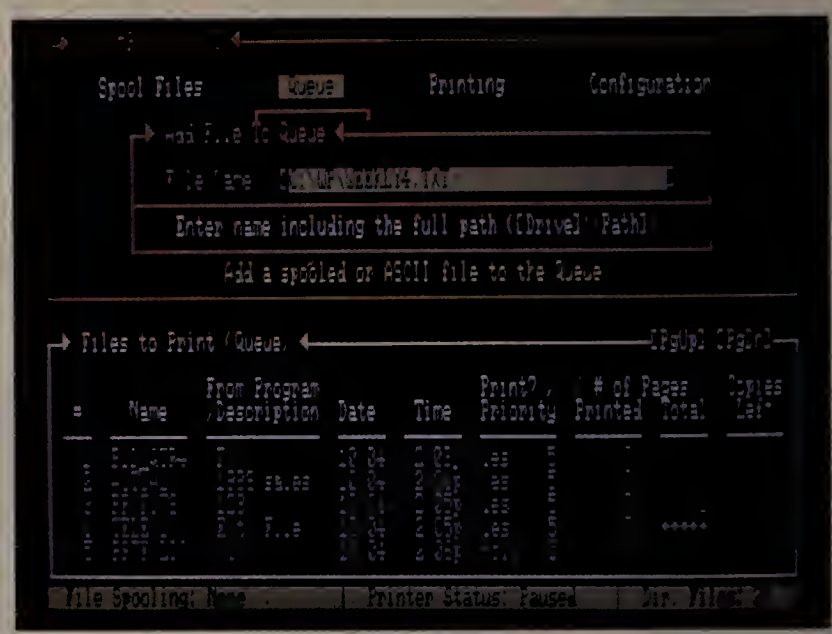
Printing Without the Printer

It doesn't matter if you're packing the most powerful laptop ever made on that next plane ride; you'll never get off the ground if your software requires a printer to generate reports. You could haul a printer along, of course, but *PrintRite* offers an easier-going solution.

The memory-resident paperless printing utility will fool even the pickiest software into thinking that it's driving a printer. *PrintRite* actually compresses paperless print jobs, spools them to a DOS file, and places them in a print queue ordered by priority and form type. While a report is "printing" sans paper, you can monitor it on line. Better yet, use *PrintRite*'s report viewer to page forward and backward through the file or even search by character string.

Reports spooled to disk can be held indefinitely until you're ready to print (you can also store them as editable ASCII files—handy for programs that can't "print to disk"). When you get back from your trip, hot-key to the main menu's printer management options such as stop, pause, and restart. You can send reports—or any text file—to any of five printers for background printing. A virtual print buffer allows you to keep working in a foreground application. You also can control output via escape codes sent to the printers. *PrintRite* sells for $99.95 and requires DOS 2.0 or a later version and 50K of memory. Rite Software Inc., 4144 N. Central Expressway, Dallas, TX 75204; 800/331-6977. —*Mark Henricks*

Reader service no. 738



A memory-resident print utility for laptops, PrintRite compresses and queues reports on disk for printing when you return from your trip.

Hewlett-Packard
(continued)

4.0, PageMaker, Ventura Publisher, Lotus Manuscript, WordStar 2000, and *WordStar Professional 5.0* support *Type Director*–generated fonts, allowing you to pick them from internal application menus.

Type Director automatically gauges the amount of disk space a font of a particular size requires and checks to see if you have enough available. If necessary, you can erase fonts from your disk with the program. Additionally, you can load just the characters you want from large, memory-intensive fonts, so you can use only 10 characters, instead of an entire set of 256, to create a single 200-point headline.

Type Director requires DOS version 3.1 or a later version, 640K of memory, and a hard disk. It's priced at $95, but the CG Times, Univers 1, and Decorative 1 typeface packages cost another $195 each. Hewlett-Packard, 3000 Hanover St., Palo Alto, CA 94303; 800/752-0900. —*Wes Nihei*

Reader service no. 736

Mannesman Tally
(continued)

designs require replacement of the entire cartridge. Mannesmann Tally claims that this means an operating cost of less than 3 cents a page, excluding paper. Paper can be fed as individual sheets or through a 250-sheet cassette that adjusts to letter, legal, label, and envelope formats.

Resident fonts are Courier Medium, Courier Bold, and Lineprinter, all in portrait and landscape modes. Additionally, two slots accept any LaserJet font cartridge, and the printer recognizes downloadable fonts. It ships with 512K of RAM, and upgrades are available in increments of 1MB, 2MB, or 4MB.

On the home front, the MT81 is a light-duty dot matrix unit that offers near letter quality printing for only $199. The device does it by using square pins in the printhead to put a crisper edge on characters—a small improvement that could mean the difference between calmly placing a finished report in your briefcase for a morning meeting or hastily reprinting it when you arrive at the office. And the MT81 won't be underfoot at home; since it weighs only 9 pounds and measures under 9 by 12 inches, you can stash it almost anywhere.

Not that the MT81 is without its limits—it clocks in at a merely okay 130 characters per second in bidirectional draft mode and only 26 cps in near letter quality mode. But pitch can be set for 10, 12, 17.1, or 20 characters per inch in draft and 10 or 12 cpi in near letter quality. High-end paper-handling features include both standard friction and tractor feeds, the ability to print single sheets without removing form paper, a quick-tear bar, and a paper path that accepts four-part forms. Mannesmann Tally Corp., 830 S. 180th St., Kent, WA 98032; 206/251-5500. —*Glenn Grant*

Reader service no. 735

If You Could Have It All.... Would You Take It ???

If you could have all the power your network fileserver needs and more, along with the reliability and stability you demand, would that be good ? If you could get all that AND on-site service for emergency repairs, would that be great ? And if you can get all that computer with all that quality and service for a great price, would that be perfect ? If that is WHAT YOU WANT, what are you waiting for? CALL US NOW !

Model 9841-File Server $5199

80386-25 CPU, 6/25 MHz clock speed, zero wait state, w/2MB 32-bit RAM, maximum 8MB on motherboard, two serial & one parallel ports, Pheonix BIOS, 1.2MB floppy drive, Perstor HD/FD controller, 130MB hard disk drive capacity (28MS access time), monographics card, 101 keyboard, amber monitor.

Same system w/290MB hard disk capacity **$6549**

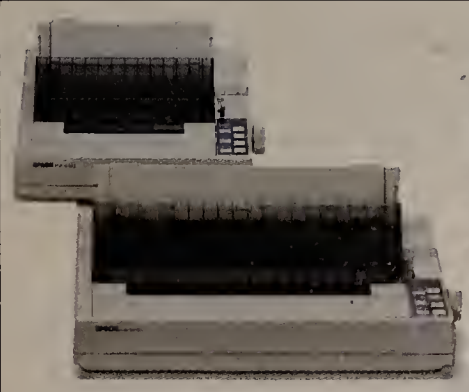
Same system w/4MB, 290MB hard disk capacity **$7329**

Model 9671 $2499

80386-16 CPU, 16MHz clock speed, zero wait state, w/1MB 32-bit RAM, maximum 33MB 32-bit RAM, two serial & one parallel ports, AMI BIOS, 1.2MB floppy drive, 1:1 interleave HD/FD controller, 40MB hard disk drive, EGA card, 101 keyboard, EGA monitor.

All systems include a one year nation wide on-site service.

All prices are subject to change without notice. Microsoft Window, Pheonix, ESDI, and Epson are the trademarks or registered trademarks of their respective companies. ELT4 v 2 2/6/89



FX-850 & FX-1050

Epson's FX printers are legendary in the computer products industry. The FX-850 and FX-1050 continue Epson's long tradition of quality, performance and reliability. Now with increased speed and advanced features, the legend grows stronger.

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Built-In Convenience. Epson's SelecType front control panel puts popular printer features and SmartPark operations at your fingertips.

High-Speed Productivity. Both print 264 characters per second (CPS) in draft mode and 54 CPS in Near Letter Quality mode—insulated for quiet operation.

Backed by the Leader. Like all Epson computer products, the FX-850 & FX-1050 printers are supported by a nationwide service network and backed by Epson's one year limited warranty.

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Laser-Ready

Dress Up Your Off-the-Rack Business Forms

Many people buy laser printers because they're quiet and dependable and print professional-looking letters fast. That's a little like buying a Ferrari because it's easy to park.

But behind the average company's correspondence lie piles of business forms, mailing labels, overhead transparencies, and other documents that could be generated on those lasers if their owners weren't reluctant to invest time and money in learning a desktop publishing program.

Laser-Ready is a $99.95 shortcut, a printing utility that helps you get more out of your laser by providing the software, fonts, templates, and supplies for printing forms that you might otherwise buy or produce by less convenient means. You choose from a selection of more than 30 fill-in-the-blank business documents, including two types of invoices, purchase orders, and monthly statements and six styles of letters. Use its simple word processor to enter your company name and fill in the blanks of your form. Then, a single print command produces custom-looking forms, stationery, and even envelopes.

Laser-Ready includes templates for newsletters, fliers, notices, overhead transparencies, résumés, and mailing labels. The program automatically chooses the type size in Times, Helvetica, or Elite and downloads everything to your printer so you can also use these fonts with other PC programs.

Unfortunately, you trade flexibility for ease of use; these forms aren't customizable and so may not fit the stylistic requirements of every company. But at only 5 percent of the cost of the average LaserJet II compatible, *Laser-Ready* is not a bad bargain, especially for small firms.

The three-disk program requires DOS 2.1 or a later version, 512K of memory, a hard disk, and a CGA, EGA, VGA, or Hercules graphics board. Mind Path Technologies, 12700 Park Central Dr. #1801, Dallas, TX 75251; 800/634-7424, 214/233-9296. —*Mark Henricks*

Reader service no. 739

Laser-Ready is a shortcut for printing more than 30 fill-in-the-blank business forms.

Up Your Cash Flow

Forecasting the Easy Way

It's a rare manager who has never relied on one of today's spreadsheet heavyweights to help slash through some knotty business problem. But most labors you face day-to-day are less than Herculean. You may not need the power (and complexity) of *1-2-3* or *Excel* for a simple cash flow projection, P&L, or balance sheet—especially if you're in a small business.

Up Your Cash Flow dispenses with fancy features like worksheet linking and sophisticated output options, focusing instead on a bare minimum of common spreadsheet chores and delivering the results in a plain-Jane printout. In fact, this rudimentary forecasting tool is so straightforward that Granville Publications has dispensed with the manual. Instead, you get a single sheet of instructions telling how to install the program and navigate a similarly abbreviated set of menus.

Esc to Exit — UP YOUR CASHFLOW CO. INC. — PROFIT & LOSS FORECAST

ACCOUNT	TOTAL	APR	MAY	JUN	JUL
SALES	5,965,000	375,000	350,000	425,000	350,000
MATERIAL	596,500	37,500	35,000	42,500	35,000
LABOR	894,750	56,250	52,500	63,750	52,500
OVERHEAD	298,250	18,750	17,500	21,250	17,500
COST OF SALES	1,789,500	112,500	105,000	127,500	105,000
GROSS PROFIT	4,175,500	262,500	245,000	297,500	245,000
ACCOUNTING	33,000	2,750	2,750	2,750	2,750
ADVERTISING	298,250	18,750	17,500	21,250	17,500
AUTOMOBILE	21,600	1,800	1,800	1,800	1,800
BUSINESS PROMO	119,300	7,500	7,000	8,500	7,000
COMMISSIONS	298,250	18,750	17,500	21,250	17,500
DEPRECIATION	50,000	4,167	4,167	4,167	4,167
INTEREST	6,000	500	500	500	500
INT. TERM DBT	13,252	667	1,287	1,239	1,189
OFFICE SALARIES	85,175	5,650	5,775	5,775	10,775
NET INCOME/LOSS	2,103,829	126,068	109,013	150,001	102,541

Up Your Cash Flow lets you create common business documents such as cash-flow projections, P&Ls, balance sheets, and payroll forecasts.

Up Your Cash Flow's limited options include some data entry shortcuts. For example, you can choose one of several ways to project the year's payroll—adjust last year's figure by a percentage; enter an arbitrary figure; or define payroll as a percentage of sales, as a specific monthly amount, or per employee. If you want, you can enter each employee's name, and when and how large a raise you plan, if any.

The program then produces a payroll forecast by year, quarter, and month. That's all you do, and that's all it does, except that you can pass the payroll data over to P&L, cash flow, and balance sheet forecasts. The program's repertoire also extends to limited "what if" sales projections and loan amortization schedules. Output is in a no-frills spreadsheet format; your only choices focus on content, not form.

Up Your Cash Flow retails for $129.95 and requires DOS 2.0 or a later version, 512K of memory, and a hard disk. Granville Publications Software, 10960 Wilshire Blvd., Los Angeles, CA 90024; 800/873-7789. —*Mark Henricks*

Reader service no. 737

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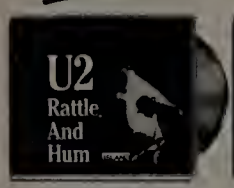

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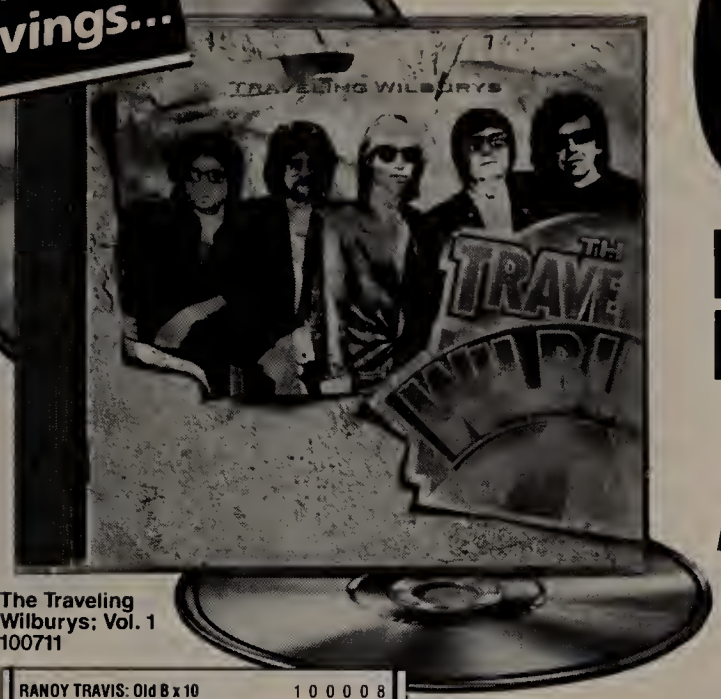

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CHICK COREA: Akoustic Band	101006
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METALLICA: And Justice For All	200478
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ELVIS PRESLEY: 18 No. 1 Hits	172190
BEST OF ERIC CLAPTON: Time Pieces	123385
BEACH BOYS: Endless Summer	223559

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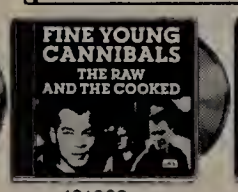

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AutoImport

Data Swapping

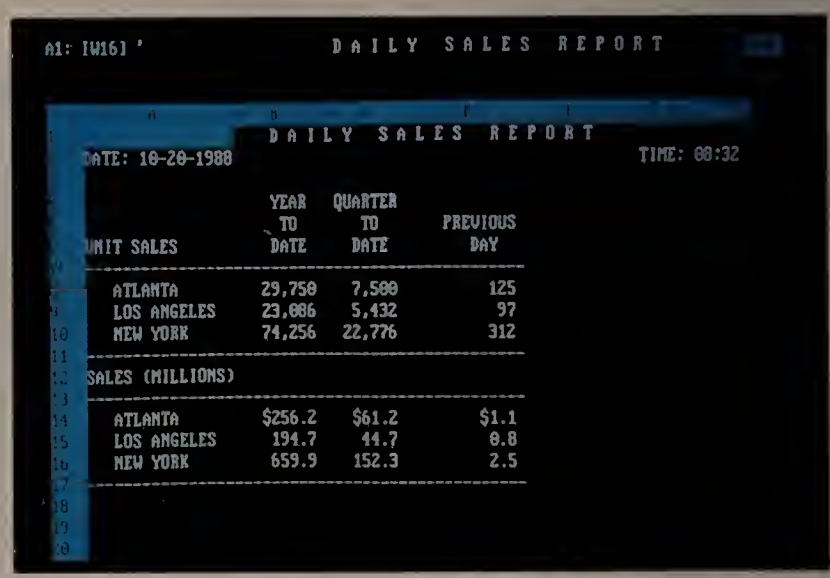
Data import/export seems to be the rage these days, judging from the number of new products dedicated to eliminating the mindless tasks of rekeying data and removing unwanted control characters. *AutoImport*'s particular twist is that in addition to swapping data between *1-2-3*, *dBASE*, and the usual cast of market leaders, it lets you download mainframe and microcomputer report data files directly in PC format without reformatting.

You can use *AutoImport*'s slash commands or point-and-shoot menu to create a "mask" of rows, columns, and headings that will import only those portions of a report that you want, cutting short your data parsing. *AutoImport* translates headings, dates, titles, and other characters into equivalents that the target application can use. It also lets you consolidate ASCII data from multiple worksheets and data bases into a single file.

The program imports standard DIF, ASCII, or ASCII comma-delimited files and reads data files from *1-2-3*, *Symphony*, *Excel*, *Quattro*, *dBASE III Plus*, and *dBASE IV*. Or you can use Printer Interceptor, a 7K memory-resident utility that captures a screen display at a touch of the <Print Screen> key, converting it into a standard ASCII file.

Priced at $169.95, *AutoImport* requires DOS 2.1 or a later version and 512K of memory. White Crane Systems, Inc., 6889 Peachtree Industrial Blvd. #151, Norcross, GA 30092; 404/394-3119.

Reader service no. 740



In addition to swapping data between popular programs, AutoImport downloads mainframe and minicomputer data files directly in PC format.

Network Eye

Taking Control of the Network

Artisoft's *Network Eye* lets you synchronize the processing activities of up to 100 workstations and get the most bang for your network buck. The program adds remote control capability to PCs on Novell *NetWare* and NETBIOS-compatible networks, letting system administrators or other authorized work-group members tune in on 1 or 100 other network nodes—viewing their screens, controlling their processors, and using their peripherals.

For example, you can sort a data base on one system, send a file by fax or modem on another, and edit a report on a third—controlling them all via individual windows on your own screen. Conversely, any number of computers can simultaneously access and control a single workstation—say, a dedicated fax PC. You can work on a single file with a fellow work-group member or broadcast on-screen activity to all PCs on the net.

Network Eye costs $295 for a network of up to 100 computers. Artisoft, 3550 N. First Ave. #330, Tucson, AZ 85719; 602/293-6363.

Reader service no. 741

Pizazz Plus

Finally—An Easy Way to Capture and Print Screen Images

Sometimes it's a lot easier to create an image than to print it out in exactly the right way. That simple fact has sold a lot of screen-capture and print utilities to impatient desktop publishers and graphics users who want output *now* without having to mess around with manuals and device controls. And as screen and output resolutions climb, and color and gray-scale printers spread, these utilities look better and better.

A look at *Pizazz Plus* shows why. Like the original version of Application Techniques' *Pizazz* utility, *Plus* lets you capture, display, and print images via a simple menu-driven interface. There are no control codes and no communication chores when switching between a wide range of software, hardware, and peripherals.

Plus's print tools keep pace with powerful new printers and image-capture boards. The upgrade adds VGA to the already extensive list of 25 graphics adapters supported, including most popular XT and AT cards. AT&T's Truevision 16, with up to 16 million colors, the Targa family, and other AT&T 6300 display adapters are also supported.

On the output end, *Plus* works with more than 220 printers, keeping separate gray-scale and

(continues)

"Is there something we missed?"

Is there anything missing in the ACCEL-500 24-pin dot matrix printer?

Not performance. The ACCEL-500 can zoom through drafts at 480 cps. Print charts and graphs in dazzling color. And combine letter quality with high resolution color graphics.

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Circle 5 on reader service card

Readability Plus

Analyze Your Writing Style

If writing isn't your strong suit, Scandinavian Systems is hawking a new version of its *Readability* style checker that could help. *Readability Plus* includes more ways to measure how your style compares to commonly accepted writing practices, tailoring its critique to the type of document you're creating.

The writing helpmate will analyze a document and make recommendations based on nine different models: general purpose writing, newspaper articles, novels, magazine feature stories, advertising copy, children's books, technical writing, government reports, and bureaucratic gobbledygook (a style to avoid).

The latest version incorporates four widely accepted measures of readability—the Flesch Reading Ease Index, the Flesch-Kincaid Index, Gunning's Fog Index, and LIX (the Fog Index's European counterpart). *Readability Plus* analyzes a document 20 ways, comparing the ratio of difficult information-laden words to more common words, the mix of short and long sentences, and the percentage of sentences containing only short words.

Readability Plus evaluates your writing style based on the kind of document you're trying to create.

Rather than making a word-by-word analysis, *Readability Plus* assesses the overall impression your writing gives and whether it's appropriate for your audience. It doesn't offer up canned prescriptions, but it does identify problem sentences, tell why they are wrong, and leave the solution to you. *Readability* reads only ASCII files, but *Readability Plus* reads files from *WordPerfect*, *WordStar*, *WordStar 2000*, and *Microsoft Word*.

Readability Plus retails for $94.95 and requires DOS 2.0 or a later version and 256K of memory. Scandinavian PC Systems, 51 Monroe St. #1101, Rockville, MD 20850; 800/288-7226, 301/983-7450.

Reader service no. 621

Pizazz Plus

(continued)

color mapping tables for all of them. You'll get up to 256 shades of gray out of a suitable black-and-white printer and as many as 16 million colors when using the right graphics board and color printer, without learning any control codes.

On the software side, *Plus* offers image capture and export to *PageMaker*, *Ventura Publisher*, *WordPerfect 5.0*, and *Microsoft Word*. Moreover, a couple of nice touches will please desktop publishers. Captured text is automatically converted to graphics mode so that it can be rotated, cropped, and printed at any size by *Plus*. Also, the software easily translates color (red-green-blue) screen images into gray-scale halftones, which can then go directly to the printer or be translated into a desktop publishing file format.

The $149 memory-resident program occupies 32K of memory and requires DOS 2.0 or a later version in a 256K machine. Owners of the older $99 *Pizazz* can upgrade for $59. Application Techniques Inc., 10 Lomar Park Dr., Pepperell, MA 10463; 508/433-5201.

—*Mark Henricks*

Reader service no. 742

Pizazz Plus lets you quickly capture, display, print, or export images in up to 256 shades of gray or 16 million colors.

For more information about any product, contact the manufacturer or circle the number on the reader service card.

Mark Henricks is PC World's Dallas-based contributing editor, Charles Kyd and Glenn Grant are frequent contributors, and Wes Nihei is an assistant editor. ●

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An SL with memory improves PC productivity by allowing all users to simultaneously send their print jobs and release their PCs to continue working without being delayed by other users or slow printers. Memory in the SL is a more sensible investment than additional memory in each printer since SL memory is shared by all users and all peripherals.

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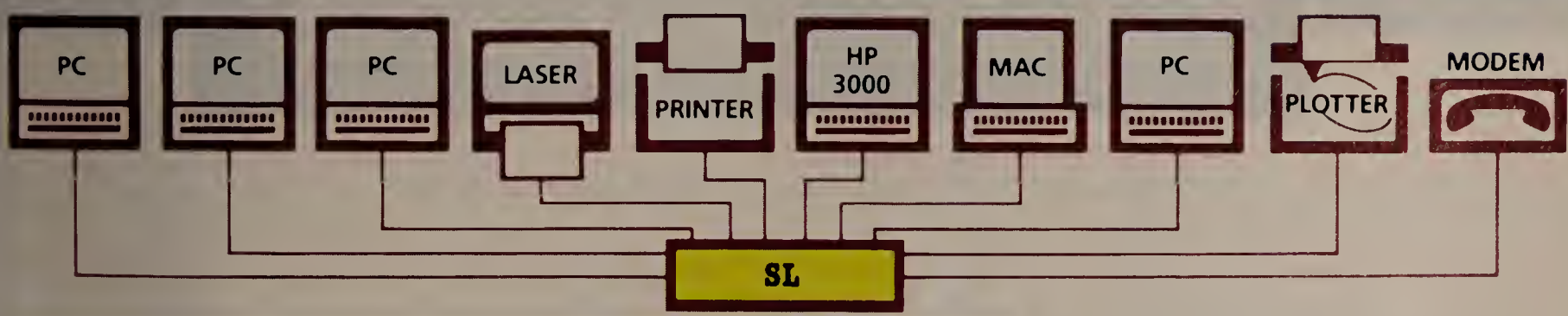

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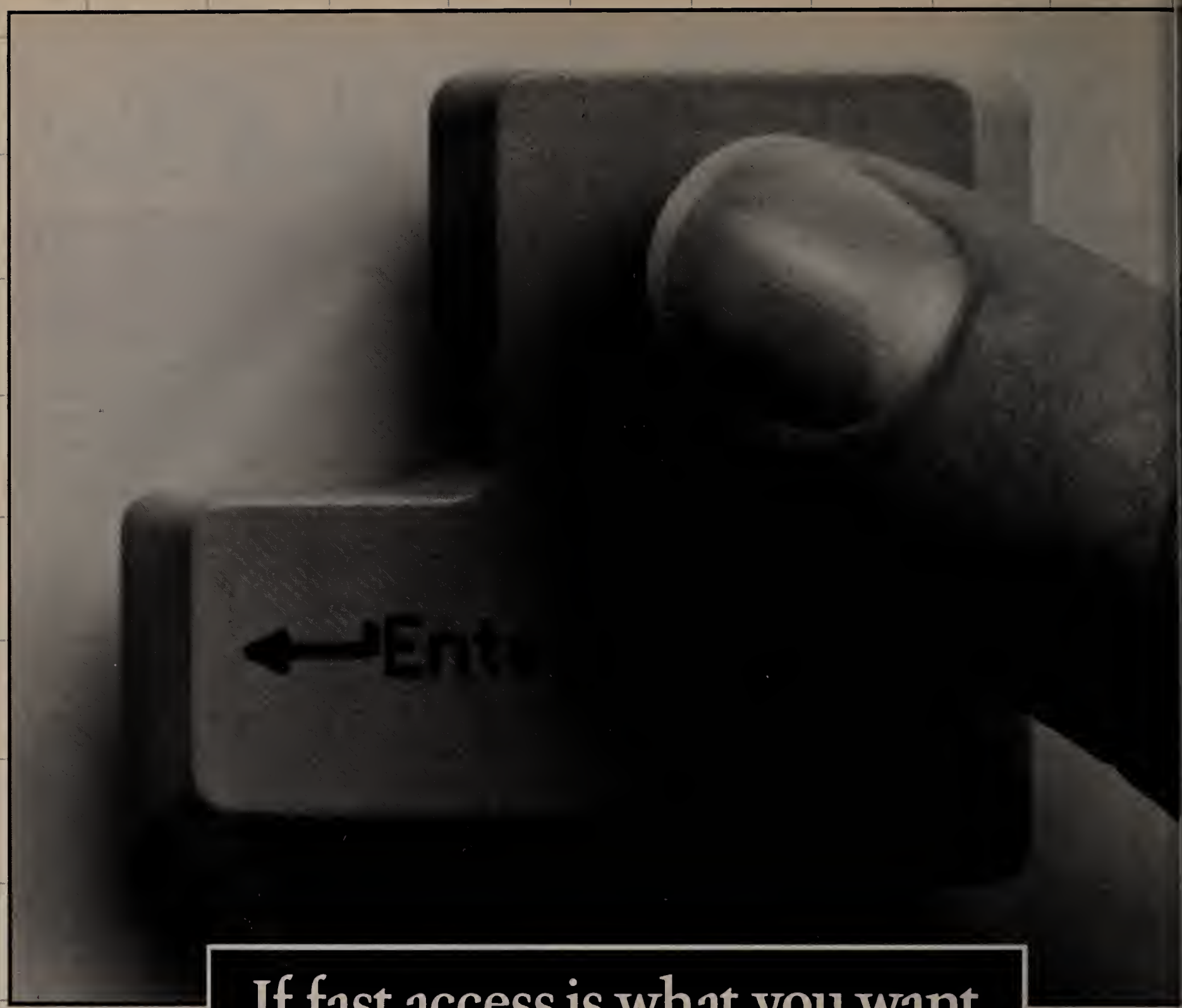

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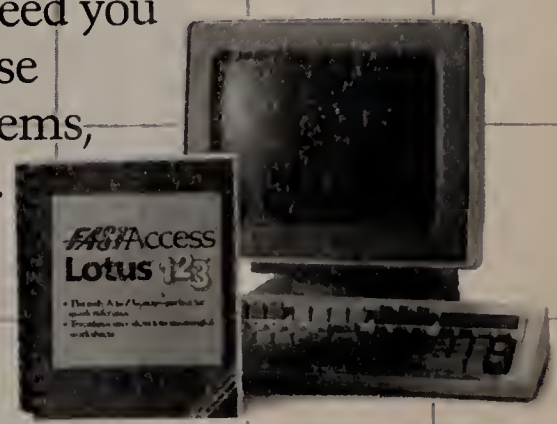

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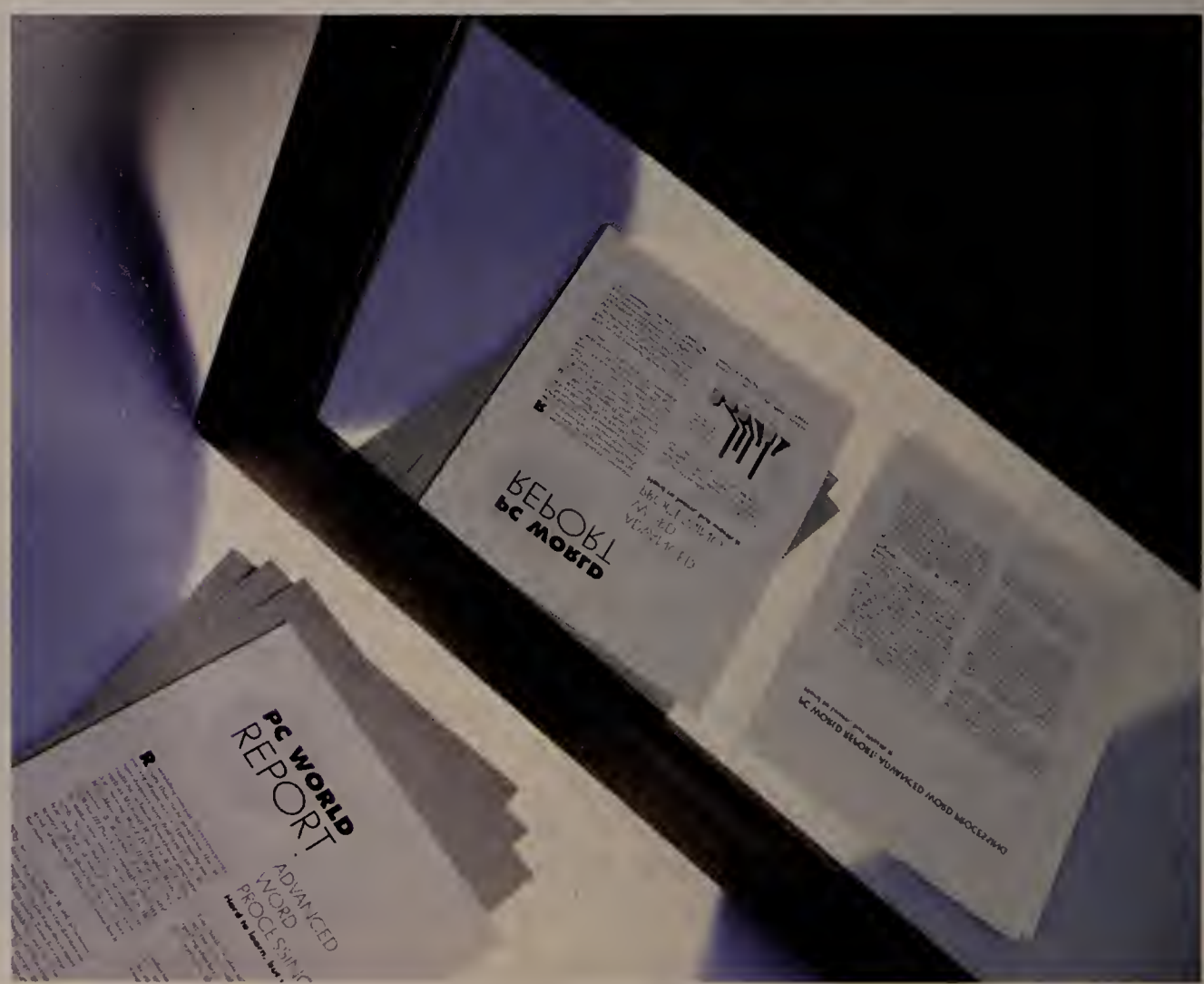
Circle 25 on reader service card

Advanced Word Processors—Familiar Faces, New Features

Not all word processors have evolved from their humble beginnings into polished modern products.

Our roundup of advanced programs identifies the ones best adapted to user demands.

George Beinhorn



Many of the major word processors have been around for years, but not necessarily because they're superior products. A large installed base, a deep discounting policy, or profound user inertia may be a more likely explanation.

Although all eight programs reviewed here are veterans—*WordPerfect 5.0*, *Microsoft Word 4.0*, *XyWrite III Plus 3.54*, *WordStar Professional 5.0*, *WordStar 2000 Plus 3.0*, *DisplayWrite 4* version 2, *MultiMate Advantage II 1.0*, and *Samna Word IV 2.0*—they're definitely not created equal. Despite their similar prices, these programs differ significantly in user convenience and sophisticated features.

Rating the Word Processors

In evaluating the software, we analyzed three key areas. First, we looked at how a product's unique "personality" contributed to (or diminished) efficiency. *Microsoft Word*, for example, provides excellent mouse support that allows for quick editing; conversely, *DisplayWrite*'s single-page orientation makes basic editing time-consuming.

Next, we ran all the products through National Software Testing Laboratories' (NSTL) speed benchmarks. *XyWrite III Plus* emerged as the fastest program overall; the others turned in mixed performances depending on the type of test.

Finally, because all the products perform basic editing functions without a hitch, we focused on critical advanced features—macros, style sheets, mail merge, desktop publishing, and printing—with a particular emphasis on ease of use.

WordPerfect and *Microsoft Word* emerged as the top-rated programs, earning *PC World*'s Best Buy award. The programs that finished at the bottom of the heap—*DisplayWrite 4*, *MultiMate Advantage II*, and *Samna Word IV*—share a lineage as dedicated word processors. Although they're not without strengths, their weaknesses are critical enough, in our opinion, to merit low ratings.

WordPerfect 5.0

WordPerfect consistently delivers cutting-edge performance. Thanks to its clean design and sophisticated array of advanced features, which include superior desktop publishing and file management, version 5.0 earns our Best Buy award.

If *WordPerfect* has any weaknesses, they stem from its sheer magnitude. For example, although the program's function key–intensive interface places a complete array of features at your fingertips, it's hard even for experts to remember the commands. Similarly, *WordPerfect*'s powerful macro language supports conditional statements, nests macros, and even recognizes syntax errors during macro execution, but it's cryptic and poorly documented.

WordPerfect's formatting features are thorough and well implemented. However, beginners may have trouble at first with the program's hidden codes, which make it easy to overlook errant format changes.

WordPerfect's style feature is roughly comparable to *Word*'s style sheets. One big bonus is that *WordPerfect* styles can contain text, unlike *Word*'s. On the other hand, style changes don't occur dynamically in all the documents that use a given style.

WordPerfect's mail merge feature is powerful; it can sort and select addresses, skip improperly formatted records, and automatically reformat merged text. However, the program doesn't read *1-2-3*, *dBASE*, or ASCII-delimited files.

FRED STIMSON

FEATURES EVALUATION

Word Processors: The Haves and the Have-Nots

Prices don't vary greatly, but features do. Although all the programs are competent in basic editing, top-rated Microsoft Word and WordPerfect offer more advanced features.

● Yes
○ No
◒ Deficient

	DisplayWrite 4 version 2	Microsoft Word 4.0	MultiMate Advantage II 1.0	Samna Word IV 2.0	WordPerfect 5.0	WordStar 2000 Plus 3.0	WordStar Professional 5.0	XyWrite III Plus 3.54
Standard features								
Price	$495	$450	$565	$595	$495	$495	$495	$445
Editing								
Maximum number of windows	1	8	1	2	2	2	2	9
Undo command	○	●	●	●	●	●	●	●
Spelling checker/thesaurus	●	●	●	●	●	●	●	●
Cross-referencing	○	●	○	●	●	●	○	●
Redlining	●	●	○	●	●	○	○	●
Outliner	●	●	○	●	●	●[1]	●	●
Macro learn mode	●	●	●	●	●	○	○	●
Macro editor	●	●	●	●	●	●	●	●
Macro programming language	○	●	○	●	●	○	○	●
Formatting								
Style sheets	○	●	○	○	●	●	○	●
Widow/orphan control	●	●	●	●	●	●	●	●
Leading control	○	●	○	○	●	○	○	●
Snaking columns	●	●	●	●	●	●	●	●
Side-by-side columns	○	●	●	●	●	●	○	●
Mail merge								
Reads 1-2-3	●	●	○	●	○	●	●	○
Reads dBASE	●	○	●	●	○	●	●	●
Reads ASCII-delimited	●	●	●	○	○	●	●	●
Uses merge variables	●	●	●	●	●	●	●	●
Uses conditional statements	●	●	●	○	●	●	●	○
Uses math	●	●	●	○	●	○	○	○
Creates data entry form	○	●	●	○	●	●[1]	●[1]	●
Desktop publishing								
Imports graphics	○	◒[2]	○	●	●	●[1]	○	○
Page preview	○	●[3]	●[3]	●	●	●	●	●
Sizes and crops graphics	○	○	○	○	●	●[1]	○	○
Text flows around graphics	○	○	○	●	●	●	○	○
Line draw	●	●	●	●	●	●	●	○
Text boxes/borders	○	●	●	○	●	●	●	○
Printing								
Proportional spacing	●	●	●	●	●	●	●	●
Queues documents	●	●	●	●	●	○	○	●
Background printing	●	●	●	●	●	●	●	●
Supports PostScript	○	●	○	○	●	●	●	●

[1] Graphics are imported at time of printing.
[2] Requires separate utility, included in package.
[3] Requires optional utility.

EXECUTIVE SUMMARY

WordPerfect 5.0

Word processor

Top-notch features and streamlined design make *WordPerfect* the all-around best package. Unless you want *Word*'s powerful style sheets and mouse support, *WordPerfect* is a Best Buy choice for virtually any word processing application.

	POOR	FAIR	GOOD	EXCELLENT
Editing				●
Formatting			●	
Mail merge				●
Desktop publishing				●
Printing				●
Speed			●	
Overall value				●

Reader service no. 720

5.0's desktop publishing features are the best of the group. The program imports graphics in most graphic file formats, and a screen-capture utility covers the exceptions. Imported images can be sized, rotated, framed, and repositioned. You can preview text and graphics in color, but you can't edit in preview mode. *5.0* offers above-average printer support, too.

Although the interface can be difficult and the hidden format codes a nuisance, *WordPerfect*'s overall power and versatility make it an excellent value.

Microsoft Word 4.0

Microsoft Word 5.0, which was unavailable for review at press time, adds dozens of features that address most of version 4.0's deficiencies. But version 4.0 is still loaded with standout features, including first-rate style sheets, powerful mail merge, and excellent printer support. Toss in strong performance on NSTL's speed tests, and *Word 4.0* earns a Best Buy.

Word's major drawbacks are confusing menu commands (for example, Transfer Load to retrieve a file) and minimal file management capabilities. On the other hand, it's the only program reviewed that fully supports a mouse—which lets you edit at warp speed. An easy-to-use recorded macro capability and a powerful programming language also allow faster editing.

Word's code-free formatting is a pleasure, especially after hassling with *WordPerfect*'s hidden codes and *WordStar*'s dot commands. If you want style sheets, *Word* has the real thing. *Word*'s paragraph orientation allows you to tag portions of text such as headers or footers with specific styles. You can attach a style sheet to several documents at once, so when you change a style, the tagged text automatically adjusts in all the documents that use that style sheet.

Word's solid mail merge feature can pause for input from the keyboard and insert text files into a merge document. And *Word* can create data entry forms, though not as well as *WordStar 2000 Plus*'s Fill-a-Form add-on.

Word's desktop publishing tools are no match for *WordPerfect*'s. In fact, you must use *Windows* and a separate utility called

EXECUTIVE SUMMARY

Microsoft Word 4.0

Word processor

Word's features are comprehensive and well implemented, earning it a Best Buy. Version 5.0, which was unavailable at press time, should fill some of the gaps in file management and desktop publishing that separate *Word* from *WordPerfect*.

	POOR	FAIR	GOOD	EXCELLENT
Editing				●
Formatting				●
Mail merge			●	
Desktop publishing			●	
Printing				●
Speed			●	
Overall value				●

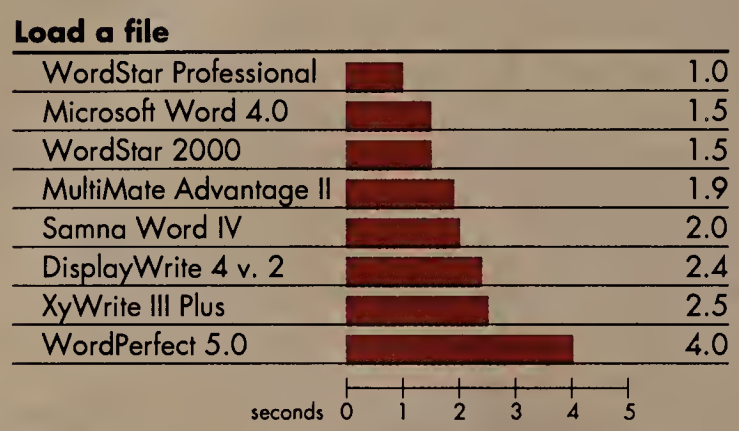
Reader service no. 721

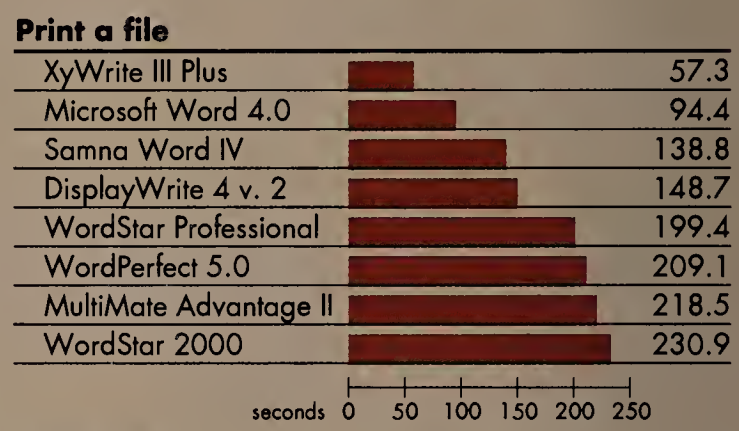
Microsoft Word is the only program reviewed that fully supports a mouse—which lets you edit at warp speed.

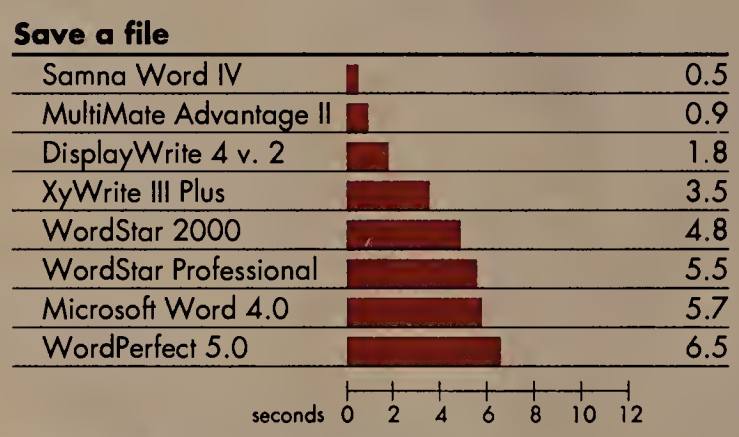
NSTL TEST REPORT

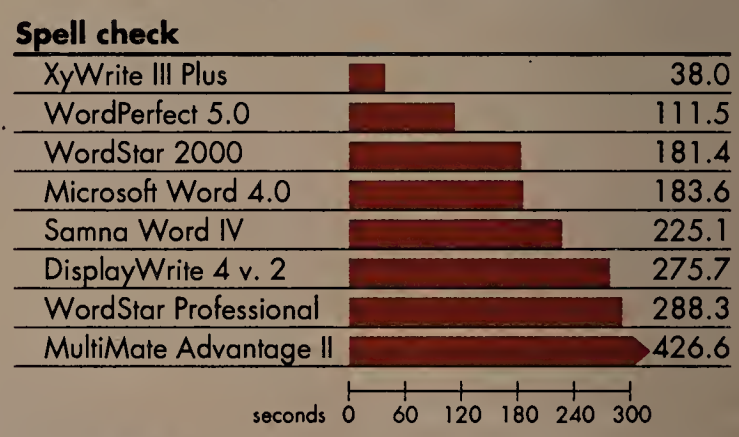
Advanced Word Processors: Speed Isn't All

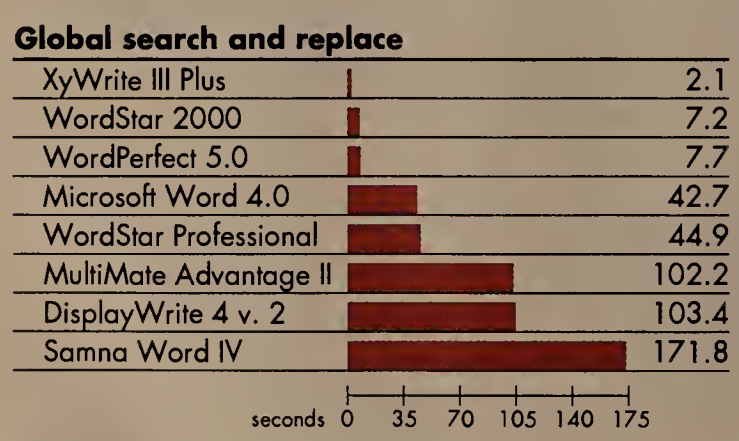
Though XyWrite III Plus is the fastest program overall, Microsoft Word and WordPerfect earn Best Buys because they provide a winning combination of features as well as sufficient speed.

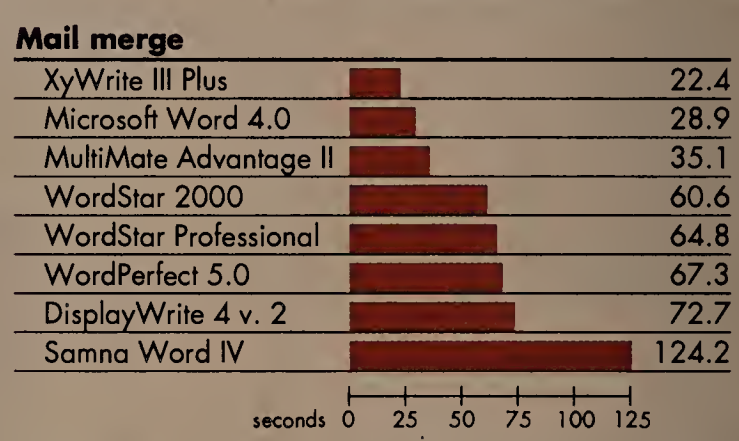












Methodology
Tests were conducted on a 12-MHz Compaq Deskpro 286 with 1MB RAM, DOS 3.3, and a 20MB hard disk. All tests were timed from the command to initiate the test function until control was returned to the user.

Load a file
This test measured the time required to load a 53-page document into the text editor.

Save a file
This test measured the time required to save a 53-page document and clear the screen.

Global search and replace
With the cursor positioned at the beginning of a 53-page document, the program was instructed to automatically replace all 140 instances of *program name* with *program name v. 5.0* and to reformat and repaginate the document as necessary.

Print a file
A 53-page document was "printed" to a device that simulates an infinitely fast printer, one not slowed by paper or printhead movement.

Spell check
This benchmark measured the time a program's spelling checker required to proof a 53-page document. Before the test was timed, words that the program didn't recognize were added to the user dictionary to ensure that the program checked the entire document without interruption.

Mail merge
This benchmark measured the time required to merge a set of 20 address records in ASCII format with a one-page form letter containing 10 different merge fields, plus the time to print the letters to a device that simulates an infinitely fast printer using a Hewlett-Packard LaserJet Series II printer driver. The time required to convert an ASCII file to a proprietary format was added to the print time.

Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.

NSTL BENCHMARK TESTING

The exclusive test facility for *PC World*, **Notional Software Testing Laboratories (NSTL)**, is an independent organization that specializes in evaluating personal computer hardware and software. A recognized pioneer in state-of-the-art test design, **NSTL** believes that the most useful benchmark tests measure haw well products perform when executing typical business tasks. **NSTL** testers follow detailed test plans that simulate normal operating conditions. A contralled testing methadology ensures objective, accurate, and consistent results and gives consumers a sound basis for making purchase decisions. **NSTL** publishes its test results in *Software Digest Ratings Repart®* and *PC Digest.™* Neither publication accepts advertising. **NSTL** is located in Philadelphia, Pennsylvania.

Pageview to import graphics or to preview a page. And graphics can't be sized or manipulated on screen.

Word excels in printing. Fast in NSTL printing tests, the program also provides unrivaled laser printer support, including PostScript models.

At press time, Microsoft had announced that *Word 5.0* would add integrated page preview, dynamic document linking, graphics support, better file management, and a bookmark feature that automatically cross-referenced blocks of text, among other new features (see the *Word 5.0* preview in *PCW*, December 1988). These additions are likely to make *Word* more competitive with *WordPerfect* in the features war. Meanwhile, both programs deserve our Best Buy stamp of approval.

XyWrite III Plus 3.54

True to its reputation for world-class speed, *XyWrite III Plus* does *everything* fast—except, perhaps, teach you its command-driven interface. Version 3.54 eases the learning strain with excellent on-line help, an entirely new optional pulldown menu system, and the ability to build custom menus. *XyWrite*'s feature list is no match for *WordPerfect*'s or *Word*'s, but the program's speed is addictive.

Although *XyWrite*'s comprehensive formatting features get the job done, they lack panache. Format codes appear on screen as highlighted triangles; to reveal a code's function you must place the cursor on the triangle or use a special key combination to unveil all codes. *XyWrite*'s styles feature is limited to basic page layout settings and requires using abstruse format codes instead of menus.

XyWrite's mail merge is primitive, providing no support for conditionals or user prompts. Moreover, you can't sort and select records stored in the mail merge format as you can with most of the other programs.

Although *XyWrite* has some desktop publishing capabilities, they're rudimentary. *XyWrite* can't directly import graphics, and page preview is one of the program's few slow features.

XyWrite's major new addition in version 3.54 is a menuing add-on called *A la Carte*. This optional pulldown menu system is straightforward and well implemented, although naturally it's slower than the command-driven interface. But if the new menus don't satisfy, sophisticated users can create their own with the program's custom-menu capability. This complicated process involves modifying the program's help files and requires a serious study of the manual.

XyWrite's kinder, gentler menu system makes a fair bid for new users. Its feature list may be shorter than other programs', but if your main concern is high-speed editing, look no further.

XyWrite's kinder, gentler menu system makes a fair bid for new users. If your main concern is high-speed editing, look no further.

EXECUTIVE SUMMARY

XyWrite III Plus 3.54

Word processor

Nothing matches *XyWrite* for sheer speed, but the command-driven interface is hard on beginners. *XyWrite* is a solid performer, as long as you don't need advanced mail merge and desktop publishing features.

	POOR	FAIR	GOOD	EXCELLENT
Editing			●	
Formatting			●	
Mail merge	●			
Desktop publishing	●			
Printing				●
Speed				●
Overall value			●	

Reader service no. 722

WordStar 2000 Plus muscles up on its sibling with a host of add-on programs.

EXECUTIVE SUMMARY

WordStar Professional 5.0

Word processor

This new release of *WordStar* has done a fine job of playing catch-up in the features derby. Good editing, superior mail merge, and spectacular page preview must be balanced against esoteric dot-command formatting and an unexciting macro feature.

	POOR	FAIR	GOOD	EXCELLENT
Editing			●	
Formatting			●	
Mail merge				●
Desktop publishing			●	
Printing			●	
Speed			●	
Overall value			●	

Reader service no. 723

WordStar Professional 5.0

WordStar Professional, one of the first word processing programs for the PC, has steadily acquired impressive talents in recent years. Release 5.0 features optional pulldown menus, stunning page preview, laser printer support, and automatic text reformatting. Moreover, at press time, release 5.5 was waiting in the wings with upgrades to address *5.0*'s shortcomings.

WordStar's hands-on-the-keyboard <Ctrl>-*key* commands make it a facile editor for touch-typists. However, the program still uses arcane dot commands for document formatting, and it lacks style sheets. Another drawback is *Professional*'s macro feature, which like *WordStar 2000 Plus*'s requires you to construct macros in a cramped editing screen. Mail merge is a traditional *WordStar* strong point. Release 5.0 includes a bundled utility called MailList for data entry, which makes typing data files a menu-driven, error-free treat.

WordStar's document preview is easily the best of the programs reviewed. It shows a full-page view of the current page with fonts and columns accurately depicted. You can display single pages, 6 or more pages at once, or up to 144 thumbnail pages. It's too bad that *WordStar Professional* can't import graphics.

WordStar's energetic revival seems geared to attract users with desktop publishing needs. Release 5.5, which wasn't available for review at press time, will provide style sheets and the ability to import, manipulate, and preview graphics. However, arcane dot commands, anemic macros, and lack of graphics importing may make *5.0* less appealing for some users.

WordStar 2000 Plus 3.0

WordStar 2000 Plus is MicroPro's attempt to create a competitive word processor that's entirely different from *WordStar Professional*. In addition to having a completely new interface, *2000 Plus* muscles up on its sibling with a host of add-on programs and the ability to import graphics and preview them within text on screen. The program also noses out *WordStar Professional* with better-than-average speed in NSTL tests.

WordStar 2000 uses the classic *WordStar* <Ctrl>-*key* scheme, but its interface is mnemonic. You press <Ctrl>-QS to quit and save, for example, rather than <Ctrl>-KD. Editing features are capable, but macros

EXECUTIVE SUMMARY

WordStar 2000 Plus 3.0

Word processor

WordStar 2000 Plus offers a good design and a superb features list. The many add-ons that give it power also add complexity, but the program is still worthy of consideration.

	POOR	FAIR	GOOD	EXCELLENT
Editing			●	
Formatting			●	
Mail merge				●
Desktop publishing			●	
Printing			●	
Speed			●	
Overall value			●	

Reader service no. 724

must be named and retrieved like text files rather than assigned to easy-to-use key combinations.

The plain-English formatting codes in *2000* are a vast improvement over *WordStar Professional*'s dot commands. *WordStar 2000*'s style sheets, however, are only fractionally as powerful as *Word*'s: They're limited to basic page layout settings and cannot format portions of text.

WordStar 2000 Plus's mail merge recognizes conditionals and variables and can use data files from *1-2-3* and *dBASE*. A bundled program, Fill-a-Form, enables you to fill in preprinted forms on screen, then store, sort, view, or selectively retrieve them.

WordStar 2000's desktop publishing features are no match for *WordPerfect*'s or *WordStar Professional*'s, but they're adequate. *WordStar 2000*'s page preview shows just one page of text and graphics at a time. The program augments its desktop publishing features with ShowText, a charting program, and InSet, which imports graphics.

WordStar 2000 comes with a host of add-ons that work well but require you to learn separate interfaces and commands. Other bundled programs include a fast file-search utility, a document comparison program, a handy outliner, and a communications package.

EXECUTIVE SUMMARY

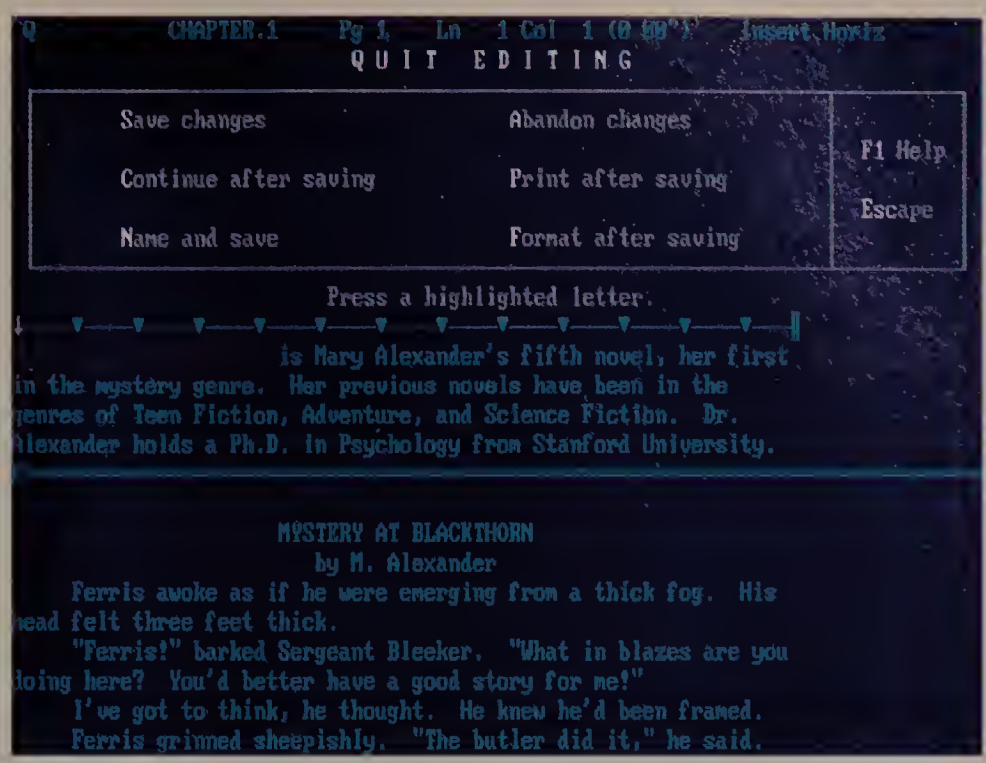
DisplayWrite 4 version 2

Word processor

DisplayWrite is still playing cotch-up with stote-of-the-art progroms like Word and WordPerfect. Current users will be pleosed with this update of o bosic word processing tool; others should look elsewhere.

	POOR	FAIR	GOOD	EXCELLENT
Editing			●	
Formatting			●	
Mail merge				●
Desktop publishing		●		
Printing				●
Speed				●
Overall value			●	

Reader service no. 725



Even though *WordStar 2000 Plus* is a heavyweight in features and convenience, its muscle-bound array of add-ons can make it hard to learn. However, if you don't mind the learning curve and if top-flight desktop publishing isn't critical, check it out.

WordStar 2000 Plus shoots for widespread appeal with easy-to-use, mnemonic menu commands and plain-English format codes.

DisplayWrite 4 Version 2

DisplayWrite 4, which evolved from IBM's dedicated word processor, suffers from vestigial links to its past. This latest version adds a thesaurus, text columns, expanded printer support, and the ability to copy document formats—features standard in high-end word processors two years ago. Time, however, hasn't slowed *DisplayWrite* down; the program produced respectable results in NSTL tests.

DisplayWrite's editing and formatting features are behind the times. For example, you can't jump to the beginning or end of a file. Documents must be manually paginated to display page breaks, multiple-line spacing doesn't appear on screen, and there's no style sheet feature. The program's macros are adequate and can be easily edited, but you won't find a programming language.

If you need desktop publishing, you'd better consider another program—*DisplayWrite* has no page preview or graphics import functions.

DisplayWrite's strong suit is its mail merge feature, which accepts data from *1-2-3*

and *dBASE*. Merge documents can use conditionals, math calculations, and even skip-to-line statements.

Although *DisplayWrite 4* version 2 is adequate for basic office duties, it still lacks state-of-the-art features. If yours is an all-IBM shop, the upgrade is definitely worthwhile; otherwise, shop around.

MultiMate Advantage II 1.0

MultiMate, the original emulator of the Wang dedicated word processor, is an old workhorse that shows its age. Ashton-Tate offers an add-on package, the Printer Enhancement Pack, that provides noninteractive page preview and font management capability. However, *MultiMate* is a cut below *Word* and *WordPerfect* in functionality, except in one area: mail merge.

Unlike *Samna* and *DisplayWrite*, *MultiMate* has clean menus, a sensible design, and excellent document summary screens. But *MultiMate* also suffers from many of those programs' deficiencies, such as inconvenient page-oriented formatting. Moreover, the program doesn't provide advanced features like a macro programming language, style sheets, or graphics import.

MultiMate's mail merge feature is superb, thanks primarily to a terrific integrated flat-file manager, On-Line, that sorts and selects merge records. *MultiMate*'s excellent forms fill-in feature can also create mail merge data files.

MultiMate's comprehensive document summary screens let you tag files with detailed, printable comments, and keywords that can be used during file searches.

EXECUTIVE SUMMARY

MultiMate Advantage II 1.0

Word processor

Although it offers a sensible design, this old-timer just doesn't match up to *Word* and *WordPerfect*. Unless you live and die by mail merge printing, look at other word processors first.

	POOR	FAIR	GOOD	EXCELLENT
Editing			●	
Formatting		●		
Mail merge				●
Desktop publishing	●			
Printing			●	
Speed			●	
Overall value		●		

Reader service no. 726

If you do a lot of complex mail merging, you won't find a better helper than *MultiMate*. However, nagging inconveniences like manual repagination drop *MultiMate* a few rungs below *Word* and *WordPerfect*.

Samna Word IV 2.0

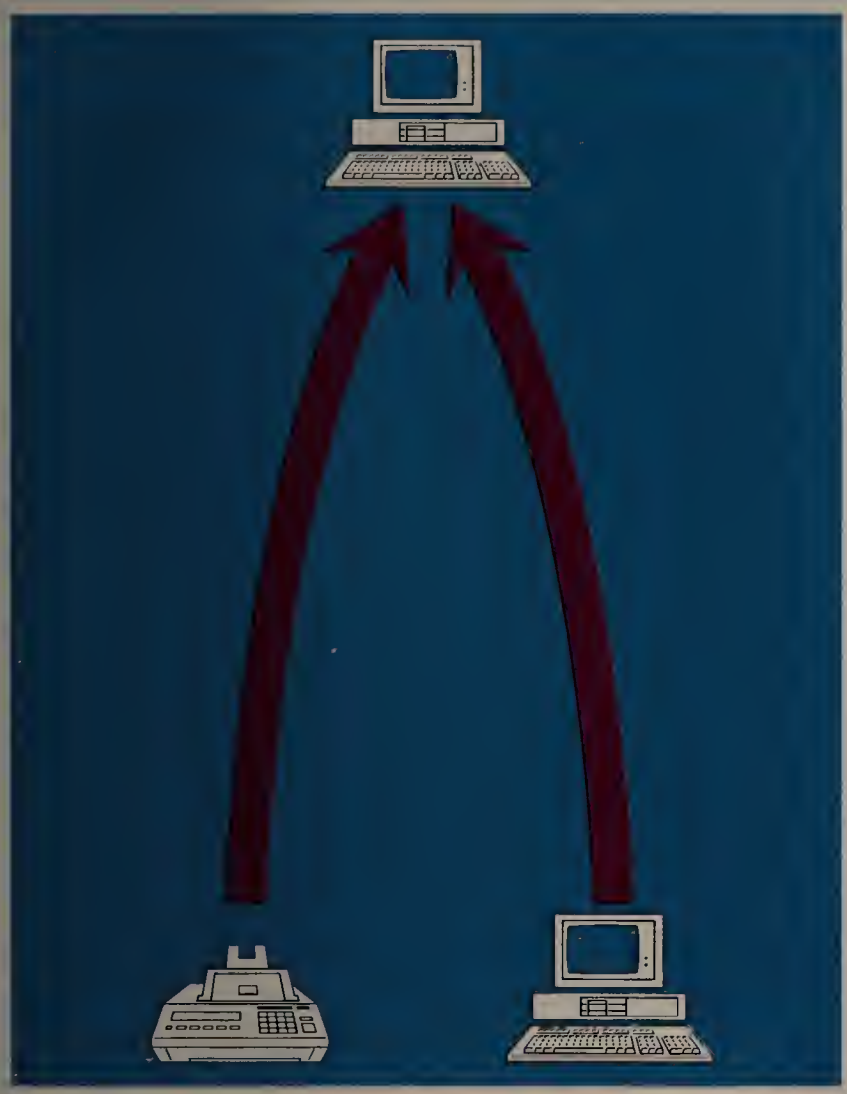
Samna Word IV is another Wang clone, but unlike *MultiMate*, *Samna* hasn't improved much on its parentage. Although it's a capable program, its interface is the hardest to learn in the group. Pulldown menus are assigned to function keys in a seemingly random arrangement, and all menu prompts are displayed in hard-to-read uppercase text.

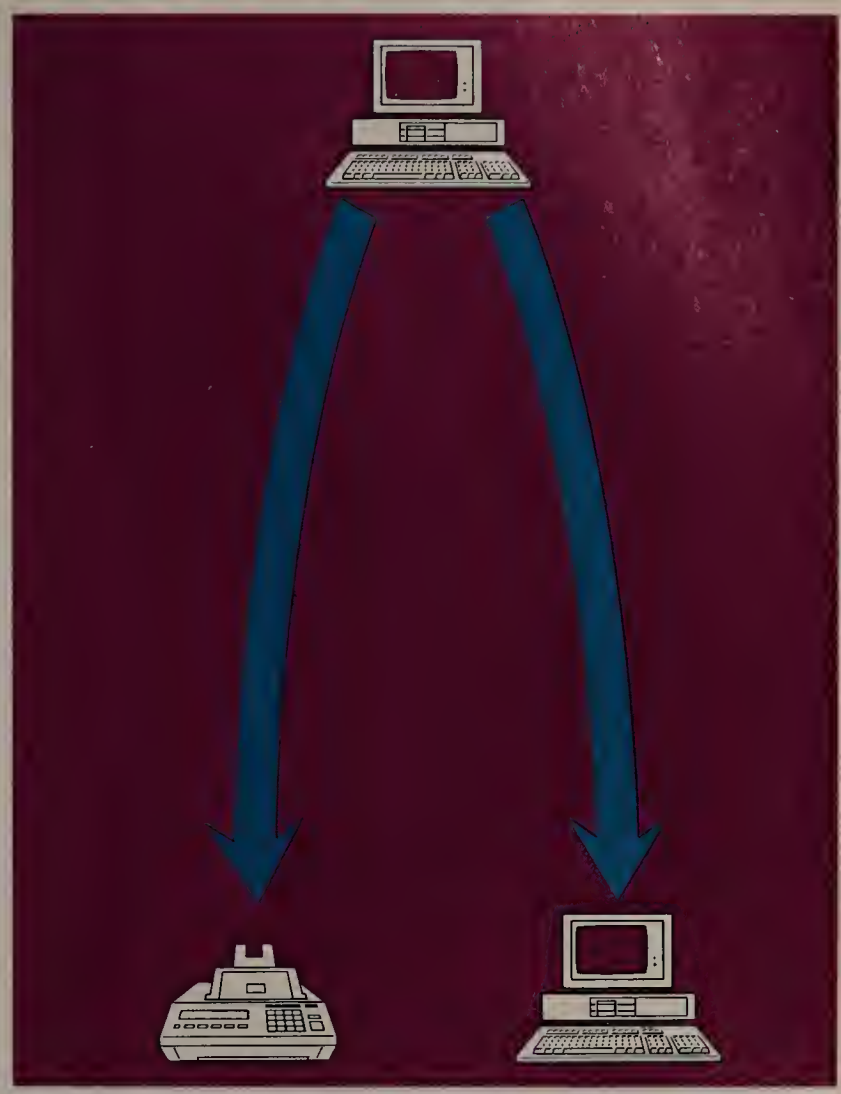
Samna requires more keystrokes to perform an editing task than any of the other programs reviewed. Although there's a macro record function, macros must be assigned to hard-to-remember function key/number key combinations, such as <F5>2.

Document formatting is capable but unexciting. Moreover, there are no style sheets, and multiple line spacing does not appear on screen. Mail merge and desktop publishing features are both weak.

In the Wang clone category, *Samna* runs a distant second behind *MultiMate*. The program is hard to learn, its features are limited, and its interface sorely needs polishing.

Easy come. Easy go.





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EXECUTIVE SUMMARY

Samna Word IV 2.0

Word processor

Samna is the hardest to use of the programs reviewed. It's relatively slow, and its features list is scant compared to the top-rated packages. These flaws more than outweigh Samna's few solid features.

	POOR	FAIR	GOOD	EXCELLENT
Editing			●	
Formatting			●	
Mail merge			●	
Desktop publishing		●		
Printing				●
Speed			●	
Overall value			●	

Reader service no. 727

The Final Word

Word and *WordPerfect* consistently push the technology envelope, and their efforts have paid off. Take your pick: These two outstanding programs are our Best Buy choices. Deciding between them comes down to whether you want *Word*'s superb style sheets and mouse support or *WordPerfect*'s strong desktop publishing features.

The second-tier programs are solid choices in their own right. *WordStar 2000 Plus* is generally excellent, but its use of memory-resident add-ons burdens it and makes it less convenient to install, learn, and use. *WordStar Professional* offers great mail merge and page preview but lacks graphics import and macro power. *XyWrite III Plus* is a full-speed-ahead text editor but trails the leaders in wealth of features.

DisplayWrite, *MultiMate*, and *Samna* are grizzled veterans whose dedicated–word-processor pasts still haunt them. Unless your office is already committed to one of these products, opt for one of the other programs. ●

George Beinhorn is a freelance writer in Nevada City, California.

WHERE TO BUY

DisplayWrite 4 version 2
IBM
Old Orchard Rd.
Armank, NY 10504
800/447-4700
LIST PRICE: $495
REQUIREMENTS: 384K, DOS 2.1 ar later version, hard disk recommended
TECHNICAL SUPPORT: available from lacal dealers
OTHER SUPPORT: nane
Reader service no. 725

Microsoft Word 4.0
Micrasaft Carp.
16011 N.E. 36th Way
Redmond, WA 98073
800/426-9400
LIST PRICE: $450, Pageview $49.95
REQUIREMENTS: 320K, DOS 2.0 ar later version, hard disk recommended
TECHNICAL SUPPORT: unlimited, na tall-free number, M–F 6–6
OTHER SUPPORT: Micrasaft Ward farum on CompuServe
Reader service no. 721

MultiMate Advantage II 1.0
Ashton-Tate
20101 Hamilton Ave.
Torrance, CA 90502
800/437-4329
LIST PRICE: 5¼-inch versian $565, $595 far both 5¼-inch and 3½-inch versians
REQUIREMENTS: 384K, DOS 2.0 ar later version, hard disk recammended
TECHNICAL SUPPORT: 90 days free, then suppart by subscription fram $50 ta $100 per year, no toll-free number, M–F 6–4:30
OTHER SUPPORT: newsletter $12/year, free bulletin baard, Ashtan-Tate farum on CampuServe
Reader service no. 726

Samna Word IV 2.0
Samna Corp.
5600 Glenridge Dr.
Atlanto, GA 30342
800/831-9679, 404/851-0007
LIST PRICE: $595
REQUIREMENTS: 512K, DOS 2.0 ar later versian, hard disk recommended
TECHNICAL SUPPORT: 30 days free, na toll-free number, M–F 8–8; extended suppart contract $125/year
OTHER SUPPORT: free newsletter
Reader service no. 727

WordPerfect 5.0
WordPerfect Carp.
1555 N. Technalagy Way
Orem, UT 84057
800/321-4566
LIST PRICE: $495
REQUIREMENTS: 256K, DOS 2.0 or later version
TECHNICAL SUPPORT: unlimited, toll-free number, M–F 7–6
OTHER SUPPORT: user BBS, free newsletter, mogazine $15/yeor, WardPerfect forum on CompuServe
Reader service no. 720

WordStar 2000 Plus 3.0, WordStar Professional 5.0
MicroPra Int'l
33 Son Poblo Ave.
Son Rafael, CA 94903
800/227-5609
LIST PRICE: $495
REQUIREMENTS: 384K (512K with add-on pragrams), DOS 2.0 or later version, hord disk recommended
TECHNICAL SUPPORT: toll-free, M–F 7–4, Sat–Sun 8–1, free support limited ta six months ofter upgrode is releosed, thereofter no tall-free phone support
OTHER SUPPORT: free newsletter, WordStor forum on CompuServe
Reader service no. 724, 723

XyWrite III Plus 3.54
XyQuest
44 Manning Rd.
Billerica, MA 01821
508/671-0888
LIST PRICE: $445
REQUIREMENTS: 384K, DOS 2.0 or later versian, hord disk recommended
TECHNICAL SUPPORT: unlimited, no toll-free number, M–Th 8–8, F 8–6
OTHER SUPPORT: free newsletter, application notes $35/year, bulletin board including application notes $50/year
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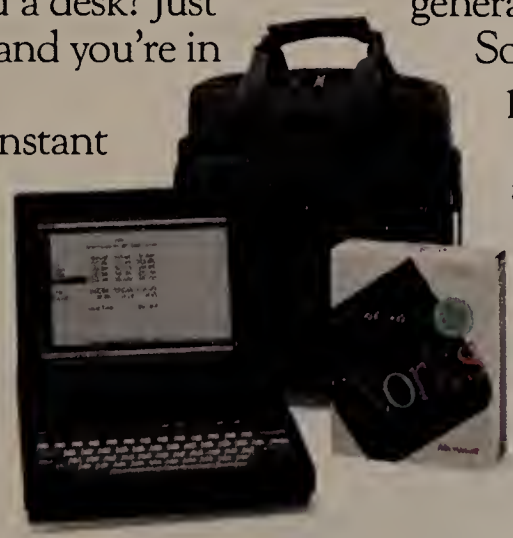

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The Best in Forms Software

Forms software can speed up one of the most tedious office tasks. But you'll want a package with an easy-to-use design module, plenty of field definitions, and generous font support.

Michael Goodwin and Luther Sperberg

Fully a third of all business documents are forms. Office supply stores stock preprinted forms for common needs, while word processors can create uncommon ones. Forms software takes you a step further. There's nothing like having a variety of good-looking forms on call in your computer, ready to be customized and printed with a minimum of muss and fuss. Furthermore, being able to automate the process of *filling in* forms at your PC can be a real boon.

Forms programs for the PC come in all stripes, from basic form printers and packages that simply fill in the blanks to full-featured design tools that enable you to create forms and merge them with keyboard entries and data base records. *PC World* looked at the field and reports here on the five that offer the most impressive combination of features and ease of use: *FormFiller*, *FormSet*, *Horizon*, *JetForm*, and *Per:form*.

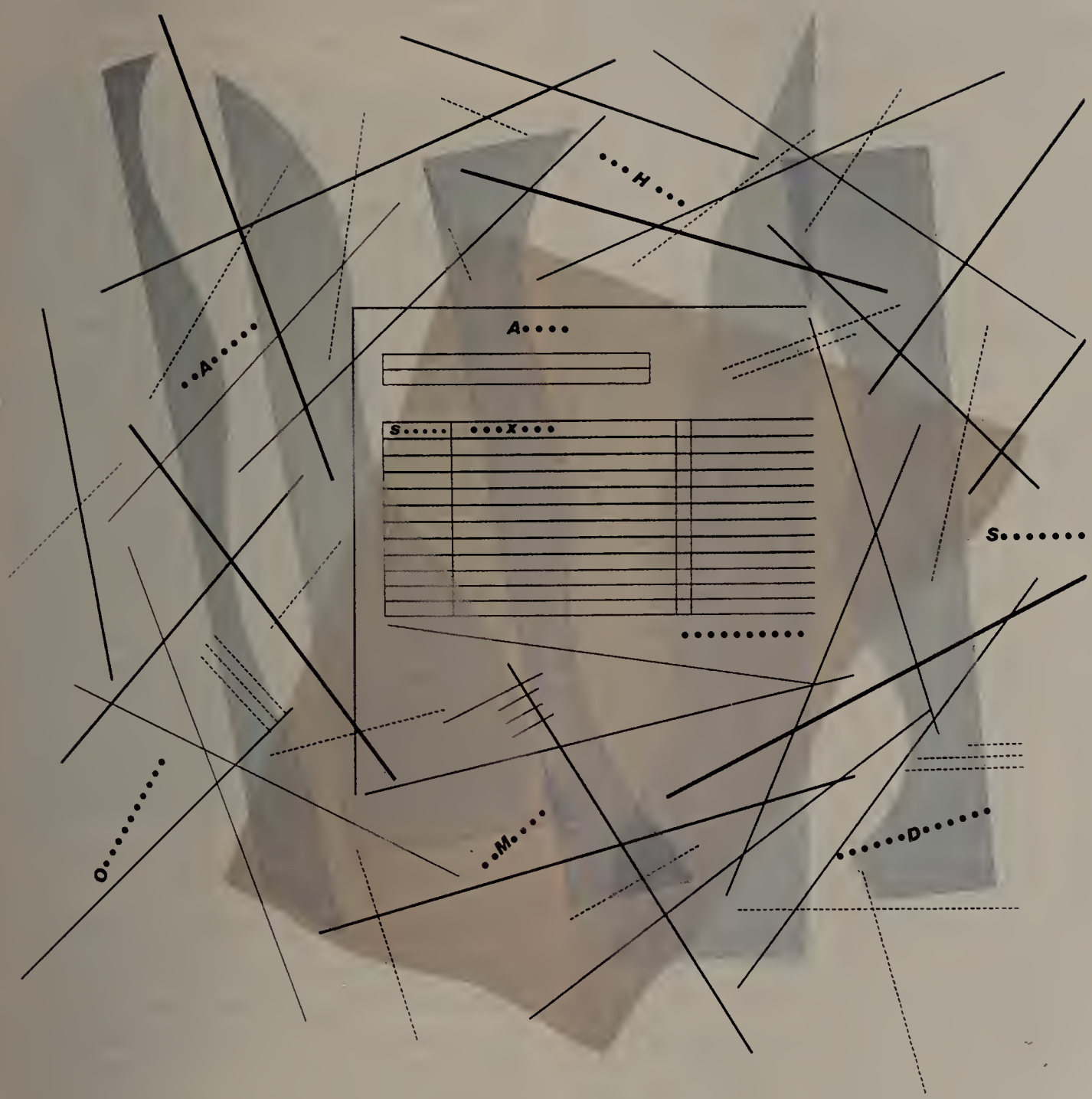
All five packages provide predesigned forms (or data entry templates) that you can customize, and three let you create brand-new forms from scratch—but some make design much speedier than others. The fastest design modules use a mouse, handy drawing tools, and a sophisticated what-you-see-is-what-you-get interface. Some even include form scanning facilities.

Automating data entry is probably the single most time- and cost-saving capability of a forms package. The best of these programs support field definitions reminiscent of a data base front end: required fields, calculated fields, and fields derived from those on other forms. All the packages can export manually entered data to an ASCII file for later use—but not with equal facility. All can import data from ASCII files (such as those produced by *dBASE* and *1-2-3*). A few can import and export data in *dBASE*'s native .DBF file format as well.

Attractive printed forms are one key objective of a forms program. The primary printing issues are print speed and the ability to use cartridge and soft fonts for professional-looking forms.

FormFiller 2.0

If you're happy with your current set of printed forms but want to computerize the fill-in and printing processes, Bloc Publishing's easy-to-use *FormFiller* is just the thing. It lets you create an on-screen data entry template with flexible field definitions and data entry and printing options. The



template can be designed to duplicate the appearance of the actual form. It even includes 24 plug-and-play templates (such as one for filling in a Federal Express shipping label). And at $149 it's among the most affordable forms packages available.

To simplify template design, *FormFiller* prints a line-and-column grid overlay on your preprinted form, from which you can extract coordinates to locate on-screen data fields. And for printing on forms designed with more (or less) than the standard 80 lines to the page, it provides easy access to the printer's vertical movement index.

FormFiller allows an unusually wide range of field definitions: calculated, compulsory, numeric, text, time, date, even Boolean IF...THEN operators. And you can write customized error messages for each field. Data can be imported from and exported to ASCII and .DBF files; in fact, you can access data from up to 640 data files simultaneously.

Many other elements of the program are also impressive. Printing is fast and flexible. Documentation is clearly written, but the context-sensitive on-screen help is so good you may never need to crack a manual.

Since there's no forms design capability, look elsewhere if you want to create forms

PIERRE-YVES GOAVEC

FEATURES EVALUATION

Per:form and FormFiller Show Winning Form

Powerful capabilities for creating forms and data entry templates, as well as field definition features and impressive ease of use, set Per:form and FormFiller apart.

● Yes
○ No
◒ Deficient

	FormFiller 2.0	FormSet 1.0	Horizon 1.1	JetForm 1.01	Per:form 1.0
Standard features					
Price	$149	$95	$195	$495	$260
Create forms from scratch	◒[1]	○	●	●	●
Forms creation					
Multipage forms	●	n/a	●	●	●
Shaded areas	●	n/a	●	●	●
Create custom help screens	●[2]	n/a	○	●	●
WYSIWYG interface	○	●	●	●	●
Number of predesigned forms included	24[1]	65	6	8	32
Modify included forms	●	●[3]	●	●	●
Mouse support	○	●	●	●	●
Scanner support	n/a	○	●	●	●
Data entry					
Calculates fields	●	●	○	○	●
Information linked among forms	○	●	○	○	○
"Same as previous entry" key	●	○	○	○	●
Compulsary fields	●	○	○	○	●
Specify field as alpha or numeric	●	●	○	○	●
Select order in which fields are filled in	●	○	●	○	●
Enters date and time automatically	●	○	○	●	●
Undo feature	○	○	●	●	○
Printing					
Number of soft fonts included	0	10	51	0	22
Supports cartridge fonts	●	○	●	●	○
Supports downloaded soft fonts	●	●[4]	●	●	●
Prints bar codes	●	○	○	●	○
Printer support					
HP LaserJet Plus Series II	●	●	●	●	●
PostScript printers	○	●	●	○	●
File import and export					
Imports data	●	●[5]	●	●	●
Imports graphics	○	●	●	●	●
Exports data to file	●	●	●[6]	●	●

[1] Data entry templates only.
[2] Can customize error messages.
[3] Highly limited customization.
[4] Only its own.
[5] Only item by item.
[6] Only one record per file.

from scratch. But if you'd prefer to stick with your familiar preprinted forms, *FormFiller* is a simple, intuitive program that can save you endless hours and countless dollars—painlessly.

EXECUTIVE SUMMARY

FormFiller 2.0

Forms creation software

If you're happy with your preprinted forms, this affordable ($149), easy-to-use package lets you speed data entry and printing by creating on-screen data-entry templates with a wide choice of field definitions and data entry and print options.

	POOR	FAIR	GOOD	EXCELLENT
Forms creation			●	
Data entry				●
Printing			●	
File import and export			●	
Overall value				●

Reader service no. 680

FormSet 1.0

At $95, Softview's *FormSet* boasts the lowest price in the roundup. It comes with no fewer than 65 good-looking forms, a mouse-driven what-you-see-is-what-you-get display, and a run-time version of *Windows*. The bad news is that your options for customizing those forms are limited to adding your name, address, local tax rate, and a small logo, because *FormSet* does not include a form-design module. (Softview promises design capability by the end of 1989.)

Aside from having to skip over the fields you don't want (and can't remove), data entry from the keyboard couldn't be easier. The forms come with many fields preset for automatic calculation and numeric or text input, and pertinent information is linked among related forms. Pressing <F3> takes you automatically to fields with missing or inappropriate data.

Data import and export are awkward. While *FormSet* supports both ASCII and .DBF files, you must place imported data in

the form manually, field by field, using the tedious Import option on the file menu. Data export is equally painful, as the program forces you to open a different data file for each new set of record; accumulating records in a single data file is not possible.

The program comes with ten built-in, downloadable laser fonts to spiff up the page. Unfortunately, between downloading the fonts and formatting the forms, printing could not be slower if *FormSet* included a monk to hand-letter each page.

Documentation is barely acceptable, but there's good, context-sensitive on-screen help—and the manual includes a handy replica of each form.

FormSet's lack of a design module, poor data import and export, and slow printing bar it from the top spot. But if you're satisfied with its predesigned forms and plan to enter data from the keyboard, its low price, handsome output, and generous bundle of forms make it worth consideration.

EXECUTIVE SUMMARY

FormSet 1.0

Forms creation software

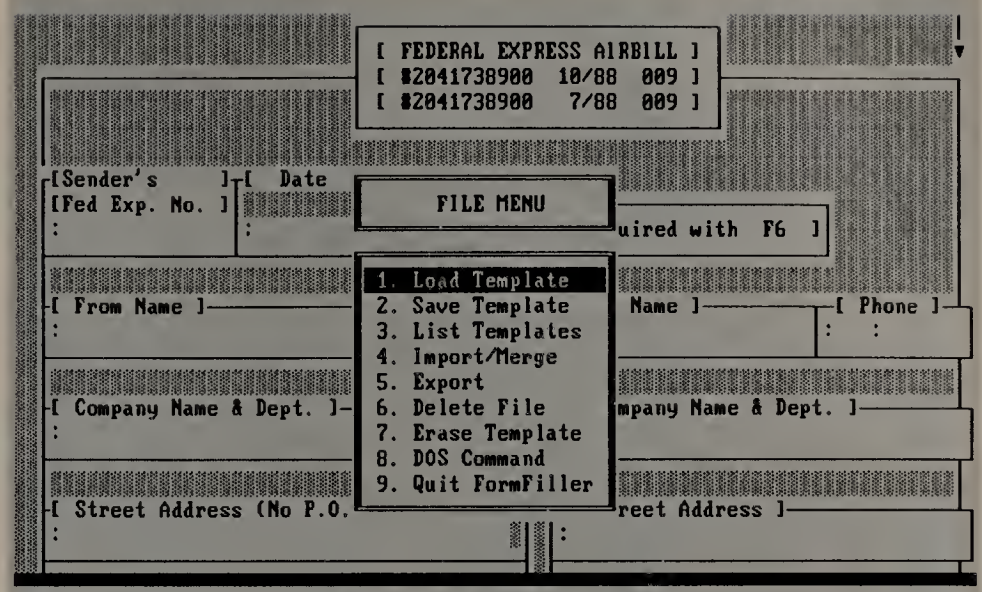
A low $95 price, o generous library of 65 good-looking forms, an eosy-to-use *Windows*-bosed interfoce, mouse support, ond excellent doto entry options are oll solid pluses, but *FormSet* locks o design module. Until it gets one, this pockage falls short of a Best Buy.

	POOR	FAIR	GOOD	EXCELLENT
Forms creation	●			
Data entry			●	
Printing		●		
File import and export				●
Overall value			●	

Reader service no. 681

Horizon 1.1

FormMaker's *Horizon* is a low-cost ($195) package that uses a run-time version of *Windows*' powerful, mouse-driven, what-you-see-is-what-you-get design module. *Horizon* comes with 51 downloadable fonts and produces sharp-looking forms. However, its ability to define data fields is paltry, and its data entry and export modules are woefully backward.



Load a FormFiller form Template from the disk.

FormFiller lets you design data entry templates so preprinted forms (like Federal Express Airbills) can be filled out on screen.

Only six forms are provided, but powerful, easy-to-use design tools (and *Windows*' handy pulldown menus) make fast work of customizing them or creating new forms from scratch. You can draw boxes, divide them into any number of fields, and add lines, text, and data fields simply by clicking on the appropriate tool and dragging it to where it will do the most good.

To speed creation of forms containing lots of words, *Horizon* imports ASCII text files as well as scanned images and other graphics. You can even scan and import entire preprinted forms. Unfortunately, *Horizon* has virtually no field definition capabilities. (An optional $395 module, *Form Entry*, provides the missing field-definition options.)

Data entry from the keyboard is awkward. Unlike the other packages (including *FormFiller*), whose on-screen data entry templates look like printed forms, *Horizon* uses a forbidding data entry screen that dumps the information into the form when you're done. And saving the keyed-in data to a file (ASCII only) is anything but easy; like *FormSet*, *Horizon* creates a separate data file for each record.

JetForm from Indigo Software has the best drawing techniques in the roundup.

EXECUTIVE SUMMARY

Horizon 1.1

Forms creation software

Horizon is relatively low priced ($195), and its run-time version of Windows makes designing forms easy, but its drawbacks are serious: a stingy forms library, limited field-definition options, and hard-to-use data entry and export modules.

	POOR	FAIR	GOOD	EXCELLENT
Forms creation			●	
Data entry		●		
Printing				●
File import and export		●		
Overall value		●		

Reader service no. 682

Horizon's print module is far more impressive. Cartridge and soft fonts can give forms a professional look. Merging data from a preexisting file (ASCII only) at print time is easy, and a special high-speed HP print driver delivers pages at an impressive clip.

The installation routine (which places *Horizon* and the run-time version of *Windows* on your hard disk) is tricky, and figuring out how to access the fonts is no trivial challenge. The manuals are voluminous, but the glut of verbiage makes it hard to find the information you need.

Horizon's limited field definitions and its painful data export make it a less than compelling purchase—but if all you want is the ability to design and print good-looking forms, its low price and generous font package are tempting.

JetForm 1.01

JetForm from Indigo Software has the best drawing techniques in the roundup. Like *Horizon*, it is based on a run-time version of *Windows*, and in many other respects the packages are quite similar: *JetForm* uses a mouse-based what-you-see-is-what-you-get interface and provides excellent design features; its field-definition options are narrow; and it sticks you with an unimpressive data entry module and only a few primitive sample forms.

After that, the packages diverge. On the bright side, *JetForm*'s data export options are superior to *Horizon*'s. On the dark side, it provides no soft fonts (compared to *Horizon*'s 51), and it crashed several times—usually as a result of our clicking the mouse in some secret Bermuda triangle on screen. Worst of all, at $495 it's the most expensive one in the bunch.

For that $495 you do get drawing routines that are intuitive and easy to use. Lines, boxes, circles, text, imported graphics, and logos can be created and/or placed with the mouse. You can even scan a printed form and trace it on screen. Cartridge and third-party soft fonts are displayed accurately (if a bit sketchily). Unfortunately, adding data fields is somewhat complicated, and field definitions are limited.

Data entry from the keyboard is straightforward, and data can be saved easily to an ASCII file. Custom help screens, added during the design stage, make filling in the forms even easier. Data can be imported from an ASCII file and merged with forms at print time.

EXECUTIVE SUMMARY

JetForm 1.01

Forms creation software

At $495, JetForm is not cheap. And while it boasts a run-time version of Windows and the easiest drawing routines in the roundup, you get only eight forms. Moreover, field definition options are few, no soft fonts are provided, and the program crashed a number of times during testing.

	POOR	FAIR	GOOD	EXCELLENT
Forms creation				●
Data entry		●		
Printing		●		
File import and export				●
Overall value		●		

Reader service no. 683

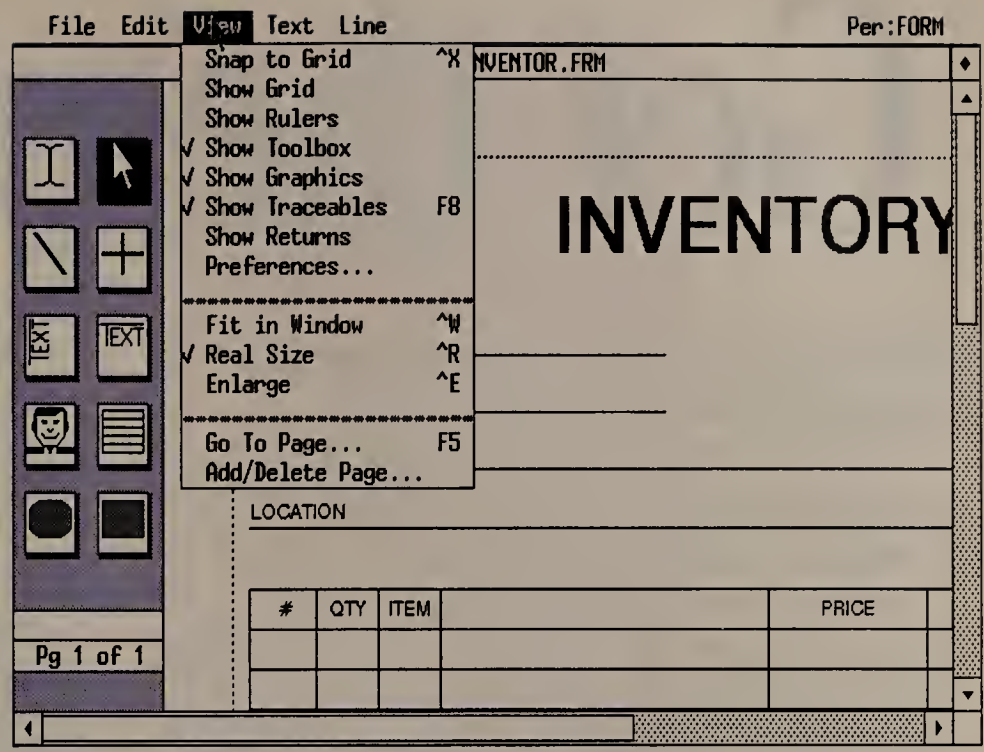
On-line help and printed documentation are excellent. Still, despite its terrific design module, *JetForm*'s relatively high price, limited field-definition options, and tendency to crash push it to the bottom of our list.

Per:form 1.0

Delrina's *Per:form* costs only $260, comes with a run-time version of *GEM*, and offers the best balance of ease of use and power in the roundup. It provides a generous 32 forms, which you can modify easily with the powerful, mouse-driven, what-you-see-is-what-you-get design module—and you can create new forms from scratch.

Per:form uses an icon-based design module. Clicking the mouse on an icon activates a tool; dialog boxes and pulldown menus let you adjust parameters. You can also import a scanned form and use it as is or scan it and trace it for a sharper printout.

During forms design you can designate data fields as compulsory, calculated, numeric, and so on and use on-screen color coding to highlight parts of the screen. In addition, you can import graphics and attach short, custom help screens to any field in the form.



Per:form comes with 32 forms, such as this Inventory form, plus icon-based drawing tools with which they can be easily customized.

Entering data from the keyboard is easy, thanks to the mouse, which allows you to fill in blanks out of sequence. Importing and exporting data to and from an ASCII file are straightforward.

A library of 22 proportionally spaced downloadable fonts is provided, and you can also use third-party soft fonts and PostScript fonts—but not font cartridges. *Per:form* supports the HP LaserJet, but unless you've beefed up your HP's standard 512K of RAM, you'll be limited to printing at 150 dpi—which makes printouts look a bit crude. Printing speed is unimpressive.

Per:form's excellent design is matched by excellent documentation. The manual includes introductory material for beginners and well-organized reference material for advanced users.

At $260, *Per:form* costs significantly less than many forms packages, and it actually delivers the power many others merely promise. It would be nice if it printed faster (and at 300 dpi with a 512K LaserJet), but these are minor complaints given the program's excellent price/performance value.

Top Form

Two forms packages are standouts. *Per:form*'s generous forms library, easy-to-use design features, excellent data entry and printing modules, and $260 price rate it Best

EXECUTIVE SUMMARY

Per:form 1.0

Forms creation software

Per:form offers an excellent combination of power, price, and ease of use. Its multitalented design module and data entry capabilities are outstanding. Printed output is fairly good, and you can use both HP and PostScript soft fonts—although you're limited to 150 dpi on an HP LaserJet with standard 512K RAM.

	POOR	FAIR	GOOD	EXCELLENT
Forms creation				●
Data entry				●
Printing			●	
File import and export				●
Overall value				●

Reader service no. 684

INTRODUCING BORLAND'S REFLEX 2.0:

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With Reflex® 2.0, when you look, you see. And you understand what your data really means.

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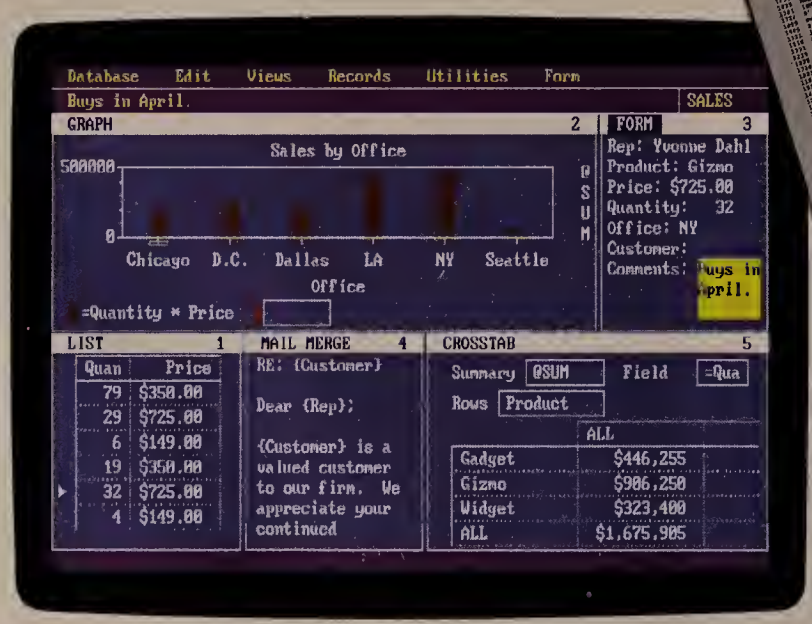


Reflex lets you look at up to five different views at once.

Hot-linked windows

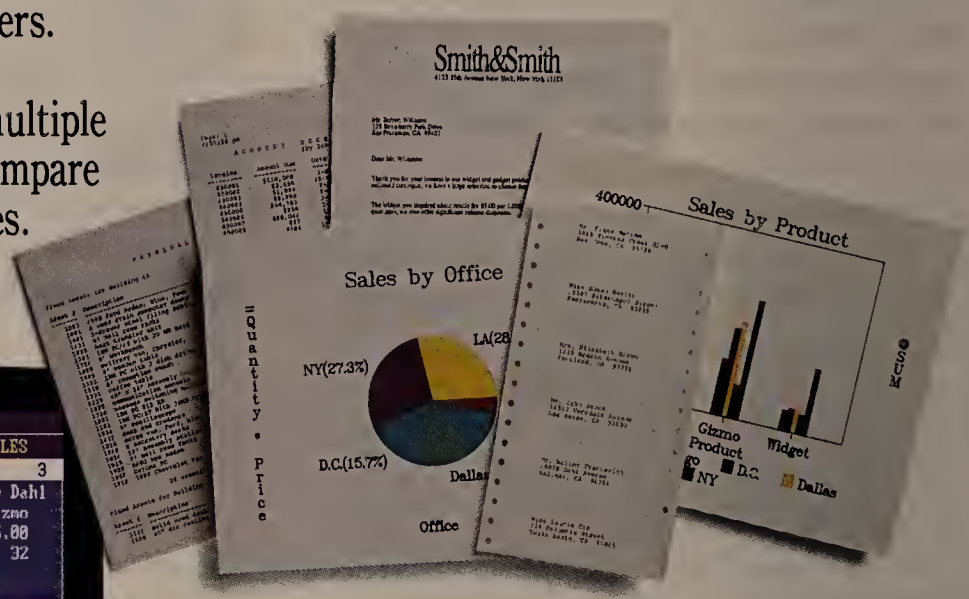
Each Reflex 2.0 window is hot-linked, so changes in one view are *automatically* reflected in others. Your data is always accurate, up-to-date, and in sync with itself.

There's more than one way to look at it

Most databases give you only one way to enter or look at data. Reflex 2.0 offers many more.

And while most databases decide in advance that you only need one form to perform all of your tasks, Reflex 2.0 lets you have as many forms as you need. With Reflex 2.0, you do it *your* way.

And there's more do's and don'ts. Reflex does graphs, they don't. Reflex does interactive cross-tabs to instantly summarize your data; multiple forms; instant WYSIWYG reports. They don't.



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Reflex 2.0 is only $249.95

Reflex 2.0 at $249.95 is a true value. If you deal with *any* kind of lists or data, and you want to see what it all means, you need Reflex 2.0.

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Code: MR02

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Circle 64 on reader service card

Buy status. If your needs are limited to filling in preprinted forms, *FormFiller* is a high-powered package with a friendly interface; and at $149 it also wins a Best Buy.

Two others, *Horizon* and *FormSet*, are less compelling but offer some tempting features. *Horizon* has only 6 sample forms, limited field-definition options, and a flawed data import routine—but its outstanding, mouse-driven design module, great-looking output, and low ($195) price are big pluses. *FormSet* is a low-end leader; it costs only $95 and comes with 65 good-looking sample forms on which data fields have been thoughtfully predefined. But it lacks a design module, which means you can't change the forms or create new ones, and data import and export are poorly implemented.

Forms processing is one of the last (and most time-consuming) office tasks to be computerized. Now, however, with the best of these forms packages, the forms bottleneck can be broken at last. ●

Michael Goodwin is an associate editor for PC World. *Luther Sperberg is a desktop publishing consultant in New York City, and teaches at the New School for Social Research.*

POWER TIP NO. 58

Quick Repeats for R:base Commands

R:base for DOS users, take heart! With just a couple of keystrokes, you can review, edit, and reuse any command issued at the R> prompt. To recall the previous command, use <Cursor Right> to reveal one character at a time, <Tab> to reveal ten characters, or <End> to display the entire command. In addition, <Page Up> and <Page Down> let you scroll through previous commands in the order you typed them. Although Microrim's documentation says only four commands can be retrieved in this fashion, *R:base* can actually step through dozens of statements in a single session. This technique is a powerful time-saver if you simply need to correct a spelling error or modify a query.

Ed Bott
Managing Editor

WHERE TO BUY

FormFiller 2.0
Bloc Publishing Carp.
800 S.W. 37th Ave. #765
Corol Gobles, FL 33134
305/445-0903
LIST PRICE: $149
ACCESSORIES: Deluxe Templote Kit (80 extro templotes) $10
REQUIREMENTS: 512K
TECHNICAL SUPPORT: no toll-free number, M–F 8–8
OTHER SUPPORT: fax 24 hours o day, 7 doys a week; customized printer drivers on demond
Reader service no. 680

FormSet 1.0
Softview
4820 Adohr Lane, Ste. F
Comarillo, CA 93010
805/388-2626
LIST PRICE: $95
ACCESSORIES: none
REQUIREMENTS: 640K, mouse
TECHNICAL SUPPORT: no toll-free number, M–F 9–5
OTHER SUPPORT: nane
Reader service no. 681

Horizon 1.1
FormMaker Software, Inc.
57 S. Schillinger Rd.
Mobile, AL 36608
800/888-8423
LIST PRICE: $195
ACCESSORIES: Form Entry madule $395
REQUIREMENTS: 640K, hord disk
TECHNICAL SUPPORT: toll-free number, M–F 8–5
OTHER SUPPORT: fax 24 hours o doy, 7 doys o week
Reader service no. 682

JetForm 1.01
Indigo Softwore Ltd.
400-560 Rochester St.
Ottawa, Ontario
K1S 5K2 Conodo
800/267-9976
LIST PRICE: $495
ACCESSORIES: none
REQUIREMENTS: 640K, hord disk, 80286 or 80386 computer
TECHNICAL SUPPORT: toll-free number M–F 9–5
OTHER SUPPORT: fax, BBS 24 hours a doy, 7 days a week
Reader service no. 683

Per:form 1.0
Delrina Technology
4454 Genesee St.
Buffolo, NY 14225
716/835-0405
LIST PRICE: $260
ACCESSORIES: Mitsubishi mouse $40; Bitstream Fontware Installer Kit, full version of GEM/3, ond extra sample forms $80
REQUIREMENTS: 640K; mouse recommended
TECHNICAL SUPPORT: no toll-free number, M–F 9–6
OTHER SUPPORT: fax 24 hours a day, 7 days o week
Reader service no. 684

Data Base Powerhouses Strike a Balance

The top four programmable data managers square off.

dBASE IV edges out Paradox 3.0 in a battle of programming power versus relational versatility.

Tony Lima

Data management users are demanding. They want the programming clout to create sophisticated applications, as well as advanced querying and reporting tools they can master without memorizing a manual. Of the four programmable relational data managers reviewed here, only Ashton-Tate's *dBASE IV* and Borland's *Paradox 3.0* have this balancing act down pat. *R:base for DOS 2.11* lists too far into the programming realm, leaving casual users behind, and DataEase International's *DataEase 4.0* welcomes novices but handcuffs developers.

All the new versions reviewed here offer enough improvements to ensure that loyal users remain satisfied, but *dBASE IV* and *Paradox 3.0* are the clear leaders. *dBASE IV* is the most improved program in the roundup (see "Is dBASE IV Worth the Wait?" *PCW*, March 1989). Much of its strength comes from friendlier querying and reporting modules that mimic (and almost match) *Paradox*'s. Yet superior development tools give *dBASE IV* a slight edge.

Tracking the Wild DBMS

All four programs include menu-driven interfaces, offer capable LAN versions, and cost between $700 and $800. All supply strong programming languages, but *dBASE IV* delivers the best development tools. *dBASE IV*, *Paradox*, and *DataEase* all provide excellent screen generators for designing data entry forms. In report writers, *Paradox* and *dBASE IV* lead the way.

Relational skills vary. *Paradox*'s excellent table-oriented query-by-example (QBE) system makes command line querying passé. It also delivers multitable forms and extras such as outer joins. *dBASE IV*'s QBE and other relational talents are slightly less refined, and *R:base* and *DataEase* lack QBE altogether.

Less crucial than QBE is support for Structured Query Language (SQL), but if you need it, you'll be disappointed. *R:base* offers a SQL-like syntax and 15 true SQL commands, but it lacks the full command set. *dBASE IV* supplies complete *DB2*-standard SQL, but querying is slow, buggy, and awkward.

As NSTL tests reveal, *Paradox 3.0* and *R:base* turned in the best performance. *Paradox*'s indexed queries are top-notch, and *R:base* excels at nonindexed reporting. *DataEase* offers surprising speed with transaction processing. *dBASE IV* bests the competition in importing ASCII files but falls behind in other categories, showing par-

JOHN LABBÉ

ticular sluggishness with nonindexed selections. As you'll see, however, performance isn't the only factor in the purchase decision.

dBASE IV 1.0

Name your favorite feature, and you'll find it in *dBASE IV.* With the addition of a hot new interface, QBE, and slick screen and report generators, *dBASE IV* finally matches its rivals' user-friendliness. Meanwhile, it reestablishes its lead in application development. *dBASE IV*'s application generator, editor, and debugger set new standards; there's also a wealth of third-party utilities. *dBASE IV* takes first place in this roundup, but mediocre speed, bumbling SQL queries, and lack of support for expanded memory keep it from earning a Best Buy.

The Control Center offers the best interface in the roundup for most users—although *DataEase* is friendlier for novices. The Control Center automatically catalogs all queries, forms, reports, and labels and opens them with their related data base.

dBASE IV's skill at generating data entry screens matches that of *Paradox* and *DataEase.* You can mark blocks on screen and move or copy them at will. Imitating *Paradox, dBASE IV* offers a quick-layout option that builds an instant data entry form using on-screen elements. Surprisingly, *dBASE IV* bests *Paradox*'s reporting talents. Both programs offer band-oriented reports that make it easy to visualize final output. Yet the edge goes to *dBASE IV,* with its canned report formats, word wrap, search and replace, and copious printer drivers.

dBASE IV's relational talents almost equal *Paradox*'s. Both permit easy linking of related data tables via QBE, and *dBASE IV* avoids disk clutter by building QBE views on the fly instead of saving them to disk. Yet *Paradox* queries are faster, and it has better multitable forms and outer joins.

So far, it's a draw, but when you look at *dBASE IV*'s robust development tools, Ashton-Tate's entry pulls ahead. Its menu-driven application generator will please programmers and casual users alike. You can write a complex program simply by designing forms, reports, and labels and then link-

dBASE IV's Control Center interface provides extensive access to data base functions. When you open a data base, all related screen objects load automatically.

ing them. You can further edit the generated code using the top-notch editor.

dBASE IV is the sole contestant with a pseudocompiler, which automatically catches syntax errors before an application runs. With *Paradox*, you must run a program, find the error, correct it, and repeat the process ad nauseam. *dBASE IV* also proffers an animated windowed debugger that lets you examine the values of variables or fields, view the active data base and current record number in a separate window, and install breakpoints.

Full-time programmers should invest in the $1295 *Developer's Edition*, which offers a linker and an unlimited free run-time license. You also get an advanced template language that works directly with screen objects such as reports and forms, converting fields and memory variables into code. Developers can modify the template source code and recompile it to their specific style.

The dBASE language itself has been notably enhanced, offering transaction logging and rollback commands to protect against network data loss. However, its SQL system needs work. Version 1.1, due out this summer, may address these issues.

User-friendly at last, *dBASE* strengthens its role as *the* powerhouse data manager for critical applications. Today, it wins out over *Paradox* by a hair, but if Ashton-Tate can boost performance and overhaul its SQL, *dBASE IV* could leave the pack behind.

EXECUTIVE SUMMARY

dBASE IV 1.0

Relational data manager

With its excellent development tools, *dBASE IV* offers the best programming environment in the roundup, and casual users will be pleased with the new QBE and the report and screen generators. Despite fairly slow performance and awkward SQL queries, *dBASE IV* takes first place.

	POOR	FAIR	GOOD	EXCELLENT
Data entry and validation			●	
Development tools				●
File handling and searching		●		
Reporting				●
Capacity			●	
Performance		●		
Overall value			●	

Reader service no. 651

Paradox 3.0

Borland's $725 *Paradox 3.0* offers users a good way to harness powerful data relations without grappling with the minutiae of programming. It's the only program reviewed with built-in graphics, its QBE is still tops, and its relational skills are superb. However, *Paradox*'s development tools can't match *dBASE IV*'s. If top speed is vital, *Paradox* may be the better deal, but departments that need to develop in-house applications should pick *dBASE IV*.

Paradox's screen and report generators have always been capable, but the latest versions are superb. You can now copy a form or a report to a new table, saving both time and disk space. *Paradox*'s new business graphics module lets you easily create pie, line, bar, and stacked bar charts. Although not quite as gifted as Ashton-Tate's *Chart-Master*, *Paradox*'s graphics come free, and you don't have to convert data base files. You can also graph *Paradox*'s new cross-tabulation statistics, an analytical tool aimed at marketing departments. For example, you could quickly graph all sales according to buyers' state, sex, and ZIP code.

FEATURES EVALUATION

dBASE and Paradox: Programming Muscle Versus Relational Ease

dBASE IV dominates in application development, while Paradox leads the way in relational expertise. R:base for DOS lacks some user-friendly extras, and DataEase is short on programming skills.

	DataEase 4.0	dBASE IV 1.0	Paradox 3.0	R:base for DOS 2.11
Data entry and validation				
Command and menu driven	◒[1]	●	●	●
Validates via lookup table	●	●	●	●
Range checking	●	●	●	●
Checks duplicate index keys	●	●	●	●
Time checking	●	●	◒[2]	●
Screen painter generates program code	○	●	○	○
Development tools				
Application generator	●	●	●	●
Application generator builds modifiable program code	○	●	○	●
User defined functions	○	●[3]	●	○[4]
Macros	○	●	●	●
Animated debugger	○	●	●	○[4]
Built-in compiler	○	●[5]	○	○[4]
Program editor	◒[6]	●	●	●
Template language	○	○[7]	○	●
File handling and searching				
One-to-many relations	●	●	●	●
Many-to-one relations	●	●	●	●
Many-to-many relations	●	●[8]	●	●
Updates multiple files from one form	●	◒[2]	●	●
Self joins	●	●	●	●
Outer joins	○	●[8]	●	○
SET operator	○	○	●	●
SQL queries	○	●	○	●
Rollback command	○	●	○	○
Query by example	○	●	●	○
Query by form	●	○	○	●
Reporting				
Multifile reports	●	●	●	●
Visual band orientation	○	●	●	○
Saves report source code	●	●	○	○
Allows headers and footers	●	●	●	●
Summary reports	●	●	●	●
Mailing labels	●	●[9]	●	●
Business graphics	○	○	●	○

	DataEase 4.0	dBASE IV 1.0	Paradox 3.0	R:base for DOS 2.11
Capacity				
Forms per file	2000	▼	15	▼
Lines per form	352	32,000	330	115
File size (in billions of records)	2	1[10]	2	2
Fields per record	255	255	255	800
Characters per record	4000	4000	4000	4096
Tables per data base	2000	▼[11]	▼	80
Indexes per file	254	47[12]	255	80
Fields per index	255	100	255[13]	800
Tables per join	60	8	▼	5
Maximum open data files	60	10	▼	80
Maximum memory variables	255	15,000	▼	△
Two-dimensional arrays	○	●	○	○
Reads/writes DIF	●	●	●	●
EMS support	●	○	●	○
Data encryption	●	●	●	○

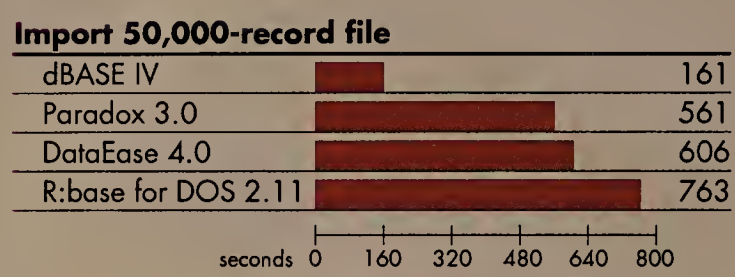
● Yes
○ No
◒ Deficient
△ Limited only by available RAM
▼ Limited only by available disk space

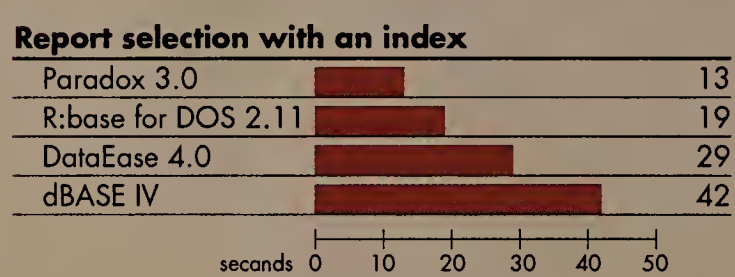
[1] Command made difficult to use.
[2] Only via a command file.
[3] Can't include macros or approximately 47 dBASE commands.
[4] Only with separately sold R:base Compiler.
[5] Saves format as object file only, not as source code.
[6] Lacks word wrap.
[7] Only in separately sold Developer's Edition.
[8] Not well documented.
[9] Lacks postal presorting and merge/purge.
[10] Or 2 billion bytes.
[11] Only via command prompt—Control Center limited to 200 tables per file type.
[12] Forty-seven keys in .MDX file; can have additional ten keys in ten .NDX files.
[13] Fields are individually tagged as key fields; every field can be a key field.

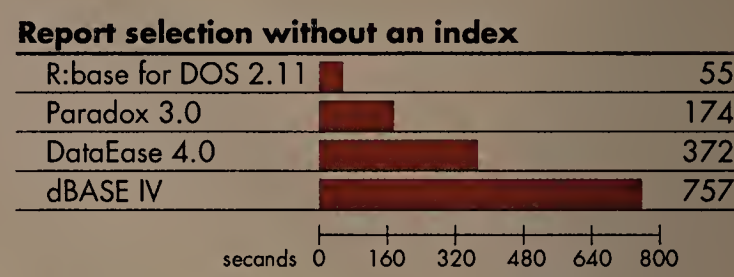
NSTL TEST REPORT

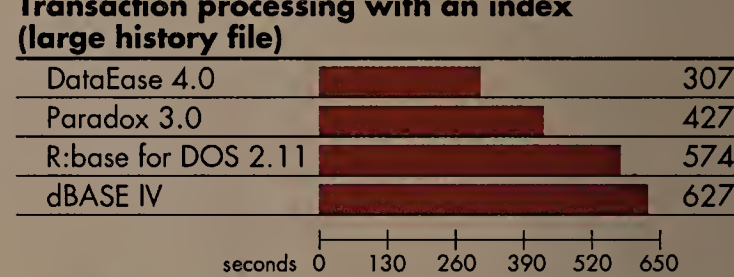
dBASE Trails the Pack

R:base for DOS 2.11 and Paradox 3.0 lead in report selection, and DataEase 4.0 takes the lead in transaction processing. dBASE IV leads the herd in file imports, but plods along in reporting tasks.









Methodology
All tests were conducted using a 20-MHz Campaq Deskpra 386 with 5MB af RAM, o 130MB ESDI hord disk, and a 256K extended memary disk cache. NSTL used o madified versian af TP1, a standard develaped aut af a real-world situotian in which a retail bonk wonted to create o system with 10 millian accaunts, 10,000 tellers, ond 1000 bronches. The standard unit af transaction selected was debit/credit.

Import 50,000-record file
Impart a 50,000-recard delimited ASCII text file in the program's data base farmat. The dato base structure was creoted priar ta the impart.

Report selection with an index
This benchmark reparted 1000 records from the Accaunt file in index arder. Selection criterio were bosed an on index.

Report selection without an index
This benchmork repeated the previaus repart-selectian test with selectian criteria nat based on an index.

Transaction processing with an index (large history file)
The Transoct file was expanded fram 1000 ta 10,000 recards, and then the TP1 benchmork was run with 1000 transactians. The Transact file therefare ended up with 11,000 recards.

Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.

Paradox retains its lead in querying with QBE enhancements such as an explicit OR operator and an outer join query. The latter includes all records in the parent table, even if there's no matching value in the child. The new SET operator (lacking in *dBASE IV*) provides complete relational algebra, letting you define and query sets of records in QBE.

One notable advance in relational technology is the ability to pull data from as many as five tables into a form and quickly edit, add, and display the results. Thus you can combine a customer record and several customer invoices on a single screen. The real bonus: Changing data in a parent table automatically updates the child tables. For example, if you change the customer phone number on the form, the phone number will change on all invoices for that customer. (*Paradox*'s rivals can display multitable forms, but you can't change the data.)

Unfortunately, this feature can lead to lost data. For example, if you use the Edit mode to change a customer ID to an ID that already exists, *Paradox* tosses out the original record and its related invoice records. If you use Co-Edit, you're at least prompted, but you can end up with invoices attached to the wrong record. Borland is working on a fix.

Paradox 3.0 adds many enhancements to PAL (Paradox Application Language), in-

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*w/32MB (40ms) Hard Drive	$979	$1149	$1378	$1478

† Includes Single 360K Floppy Drive
* Upgrade from 12" to 14" Flat Screen, add $49

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BIOS	Phoenix	Phoenix	C & T	Phoenix
Norton SI Rating v 4.0	2.1	11.2	17.6	22.0
Wait State	0	0	0	0
Standard Memory	640K	512K	1MB	1MB
Shadow BIOS	—	—	—	384K
Memory Upgrades	—	1MB	1.5/2/3/5/6/8MB	2/4/8/10/16MB
Coprocessor Support	8087	80287	80387SX	80287 or 80387
Expansion Slots: 32-bit	—	—	—	1
Expansion Slots: 16-bit	—	6	6	4
Expansion Slots: 8-bit	8	2	2	3
Dual HD/FD Controller	w/HD systems	Yes	Yes	Yes
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Serial Ports	1	1	1	2
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Keyboard	101 Key	101 Key	101 Key	101 Key
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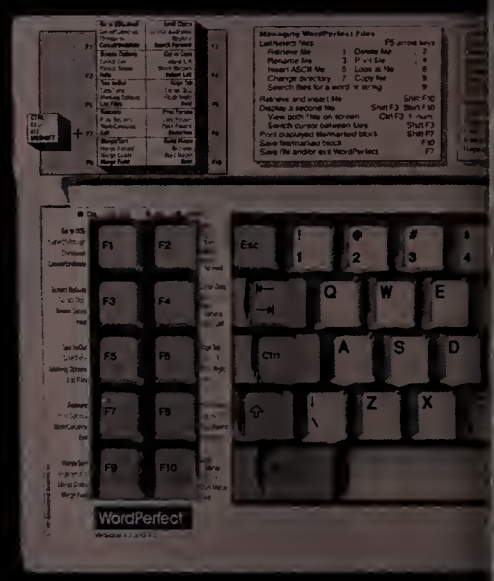

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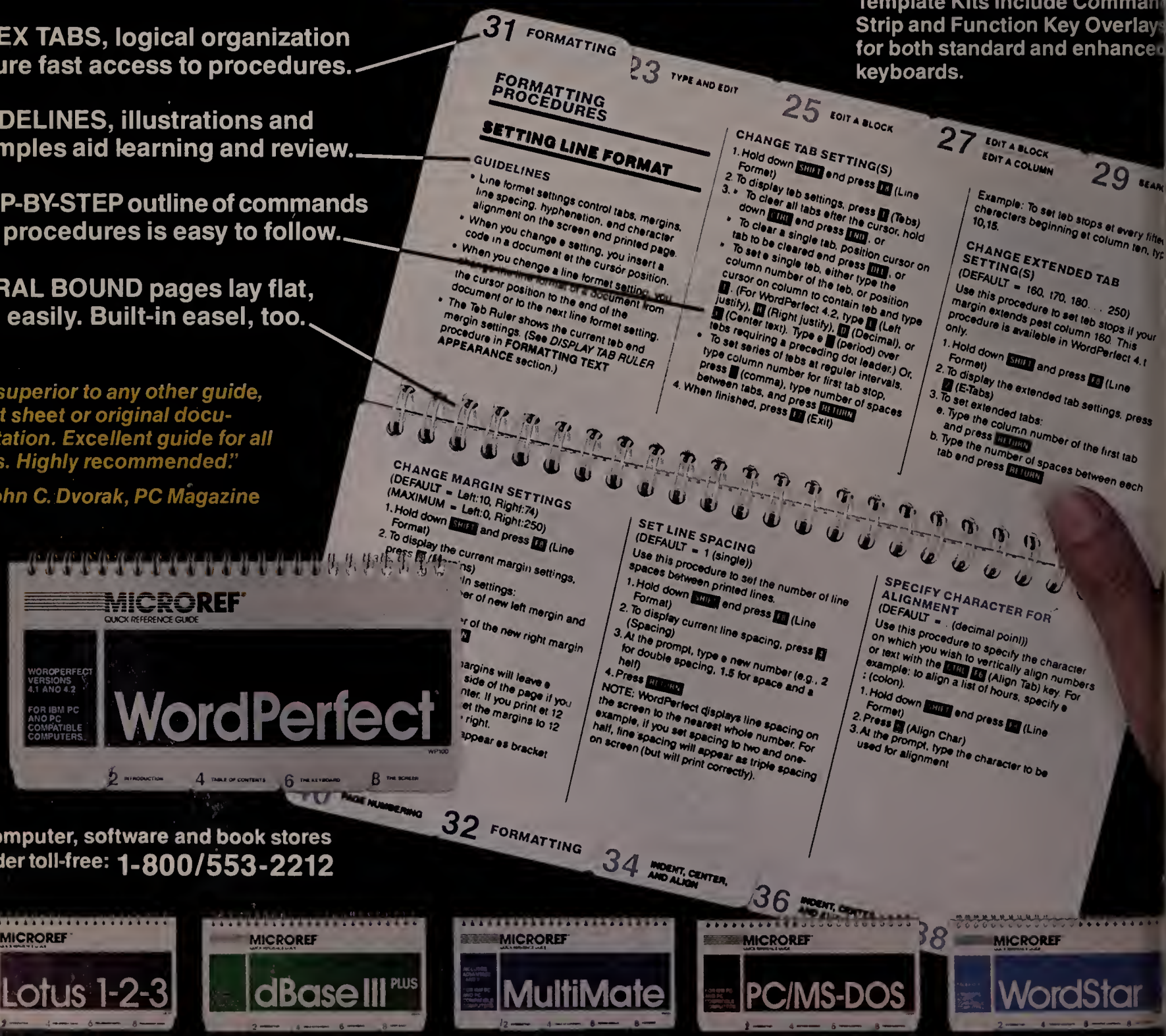

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cluding support for multitable forms and graphics, but development tools are wanting. There's still no compiler, the editor is primitive, and while the debugger is effective, it can't match *dBASE IV*'s. The application generator pales in comparison with *dBASE IV*'s and *R:base*'s. It's fast and simple but limited to building menus.

Despite its scant development tools, *Paradox* remains a strong contender. Programmers should go with *dBASE IV*, but many users may find *Paradox* a better fit.

EXECUTIVE SUMMARY

Paradox 3.0

Relational data manager

Paradox 3.0 delivers plenty of user-oriented power with its slick relational operations, built-in business graphics, and cross-tabulation statistics. But despite swift performance, its relatively weak development tools and lack of SQL leave it a half-step behind *dBASE IV*.

	POOR	FAIR	GOOD	EXCELLENT
Data entry and validation			●	
Development tools		●		
File handling and searching				●
Reporting			●	
Capacity			●	
Performance			●	
Overall value			●	

Reader service no. 652

R:base for DOS 2.11

In the not-so-distant past, *R:base* looked as if it could beat *dBASE* at its own game. It sported a muscular command language and the best application generator on the market. Today's *R:base for DOS* is no slouch—it offers fast performance, a SQL-like syntax, a template language, and for $895 extra, an .EXE compiler. Hardened developers may nod in admiration, but end users are marooned with an archaic interface that often demands input at the command prompt. Worse, *R:base* lacks QBE, and the screen and report generators fail to match up.

R:base's highly touted prompt-by-example (PBE) feature is disappointing. PBE resembles *dBASE III*'s Assistant more than it

With a 1-2-3–like top-line menu and WordPerfect–like function keys, Paradox's interface should be familiar to many users. Here, a user embarks on a QBE adventure, selecting fields with check marks.

does QBE. Even simple queries are tedious—you must build one clause at a time from menu prompts and constantly reconfirm selections. To really tap *R:base*'s power, you must journey to the command line.

The screen and report generators are feature rich but difficult to use. They're easy for simple jobs, but try a halfway complex task—such as including fields from a different table—and you're forced to type in lengthy commands. *R:base* represents report

EXECUTIVE SUMMARY

R:base for DOS 2.11

Relational data manager

A powerful tool for programmers, R:base still can't accommodate casual users. Impressive speed and SQL support don't make up for a stifling interface that demands a knowledge of command syntax for common tasks.

	POOR	FAIR	GOOD	EXCELLENT
Data entry and validation			●	
Development tools			●	
File handling and searching		●		
Reporting		●		
Capacity			●	
Performance			●	
Overall value		●		

Reader service no. 653

```
CROSSTAB SUM invtotal FOR empid BY custid FROM transx
custid    |          102          129          131          133
---------- | ------------ ------------ ------------ ------------
       100 |        $0.00        $0.00        $0.00   $129,829.00
       101 |  $417,580.25        $0.00        $0.00        $0.00
       102 |        $0.00  $213,836.01        $0.00        $0.00
       103 |        $0.00        $0.00  $252,021.00        $0.00
       104 |        $0.00  $249,348.05        $0.00        $0.00
       105 |        $0.00        $0.00        $0.00        $0.00
       106 |        $0.00        $0.00        $0.00        $0.00
       107 |        $0.00        $0.00  $247,384.25        $0.00
---------- | ------------ ------------ ------------ ------------
           |  $417,580.25  $463,184.06  $499,405.25  $129,829.00
Press any key to continue
```

Like Paradox, R:base for DOS provides cross-tabulation, a statistical tool designed for marketing analysis. This analysis shows the total sales each employee made to each customer.

bands with two-letter codes, making it difficult to visualize the final layout.

As always, *R:base*'s application generator is superb, rivaling *dBASE IV*'s. You can easily define menus and link them with other screen objects, and the resulting application generates reusable code.

R:base's heavy-duty language is enhanced with 15 core SQL commands, and like *Paradox*, it includes cross-tabulations and a TALLY command that counts how often each value occurs in a given column in a table. However, the crude editor is limited to 750 lines per file, and the debugger can only catch syntax errors one at a time. If you develop large applications, buy Microrim's $895 *R:base Compiler*, which includes a more powerful debugger and produces .EXE files.

Despite advanced features, *R:base for DOS* can't beat *dBASE IV* as a development environment or *Paradox* as a day-to-day data manager. However, its speed and SQL support should attract programmers.

DataEase 4.0

DataEase has staked its reputation on providing advanced relational powers in a friendly, completely menu-driven package. And this latest release offers some impressive enhancements: Users can manage one-to-many relationships (up to 32 tables) in a single on-screen form and perform multiple table joins simply by answering prompts. And *DateEase*'s LAN support finally matches its rivals'. But newcomers will eventually be frustrated by the program's quirky interface and lack of QBE; power users will definitely be put off by the scarcity of development tools.

DataEase 4.0 is initally inviting to beginners. Prompt-driven menus abound, and as in *dBASE IV*, associated objects are loaded when you open a data base. But frustration mounts quickly as you slog through the program's confusing combination of antiquated full-screen main menus, pulldown submenus, and inconsistently assigned function keys. Changing data bases in midsession is a convoluted multistep process, and you must convert data bases created with previous versions of the program.

Crafting data entry screens with *DataEase* is a mixed bag. It's far easier than with *Paradox*—you select the tables and fields from menus and move them around the screen at will. However, you can't use substrings in field definitions—to use an area code as the basis of a relation, for example, you would have to create a separate field.

DataEase's report writer is the worst in the roundup, and it's not even easy to use. You build reports by selecting field names from menus, but you must issue commands to specify the order of display and the group-

EXECUTIVE SUMMARY

DataEase 4.0

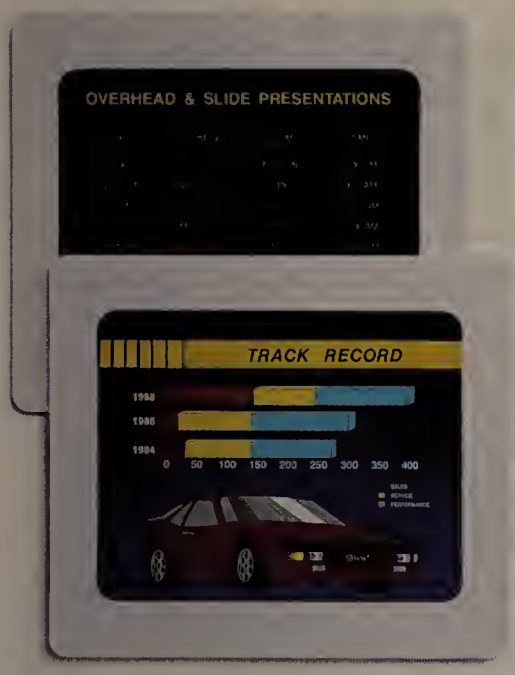
Relational data manager

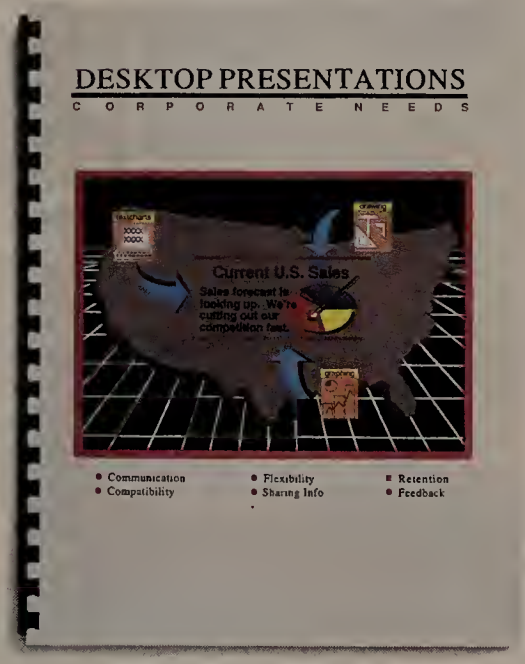
Supplying unexpected power in a totally menu-driven package, DataEase is flawed by a quirky interface, a lack of QBE and SQL, and scant development tools.

	POOR	FAIR	GOOD	EXCELLENT
Data entry and validation			●	
Development tools	●			
File handling and searching		●		
Reporting		●		
Capacity			●	
Performance		●		
Overall value		●		

Reader service no. 650

Easy To Get With The Program.





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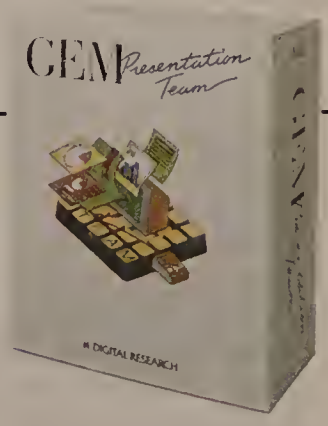

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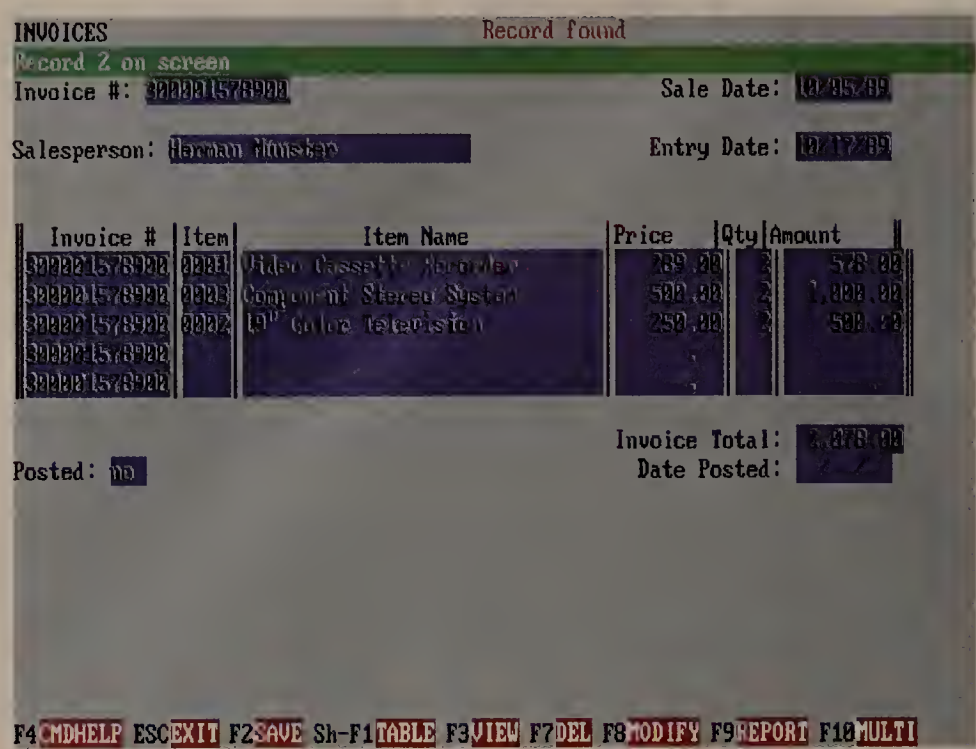

DataEase excels at creating data entry forms. You can easily include fields and records from multiple data tables on a single screen form.

ing level for each field. Don't expect lifelike page preview, either. Although it approximates report bands with codes à la *R:base*, to really see what's going on, you must print out the report.

However, there's no QBE or SQL, and the menu-driven application generator is limited. You build queries and applications with the DataEase Query Language (DQL), a thorny, verbose idiom that combines the worst of SQL and dBASE. You can construct queries using menus, but only a clause at a time. You can't load or save ASCII files, so you're stuck with a crude editor. Fortunately, programmers can turn to a developer's edition for debugging and editing tasks, and later this year users will be able to query SQL data base servers with *DataEase SQL*.

DataEase 4.0 delivers remarkable power without the need for programming. Yet its awkward interface and the lack of QBE work against its strengths.

dBASE Rides Again

Both *dBASE IV* and *Paradox 3.0* succeed in balancing the rather schizophrenic demands made on today's data base managers. But although *Paradox* is faster and delivers potent features, including graphics and relational extras, its development tools don't match up. *dBASE IV* wins in a photo finish by matching *Paradox* in user-friendliness and delivering the best data base programming environment on the market. ●

Tony Lima is a well-known dBASE *programmer and seminar leader and the author of* Inside dBASE IV *(Addison-Wesley, Reading, Massachusetts, 1989).*

WHERE TO BUY

DataEase 4.0
DotoEose Int'l
7 Combridge Dr.
Trumbull, CT
06611-9983
203/374-8000
LIST PRICE: $700, LAN Workstotion Pock (three users) $750, upgrode from DotaEase 2.5 $125 (prior to version 2.5 $175), upgrode from LAN Workstation Pock $150
REQUIREMENTS: 640K, DOS 3.1 or later version
TECHNICAL SUPPORT: unlimited support, no toll-free number, M–Th 9–8, F 9–6
OTHER SUPPORT: preferred support $150 per yeor (includes toll-free number ond priority occess to technicions), BBS
Reader service no. 650

dBASE IV 1.0
Ashton-Tote
20101 Homilton Ave.
Torronce, CA
90502-1319
213/329-8000
LIST PRICE: $795, upgrode from dBASE III Plus $175 ($30 upgrode if bought ofter Februory 17, 1988), LAN Pock (five users) $995; dBASE IV Developer's Edition $1295
REQUIREMENTS: 640K, DOS 2.0 or loter version (DOS 3.0 or loter for LAN Pock)
TECHNICAL SUPPORT: free for 90 days, no toll-free number, M–F 6–4:30
OTHER SUPPORT: Extended Support (15 calls, CompuServe subscription) $50 per year, Professionol Support (20 colls, CompuServe subscription, technicol newsletter, Close-Up remote softwore) $150 per yeor (plus $35 per hour for Close-Up online help); CompuServe forum; BBS
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Paradox 3.0
Borlond Int'l
1800 Green Hills Rd.
P.O. Box 660001
Scotts Volley, CA
95066-0001
408/438-8400
LIST PRICE: $725, upgrode from ony version $175, free upgrodes from version 2.0 if bought between December 10, 1988, ond Januory 10, 1989; LAN Pock (five users) $995; upgrode from Porodox 2.0 Net Pock $350
REQUIREMENTS: 512K, hord disk, DOS 2.0 or loter version (640K ond DOS 3.1 or loter for LAN Pock), grophics boord required to disploy grophs
TECHNICAL SUPPORT: unlimited support, no toll-free number, M–F 7–4
OTHER SUPPORT: Developer's Resource Progrom (for PAL developers) $295 per yeor for unlimited toll-free support; BBS
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R:base for DOS 2.11
Microrim
3925 159th Ave. NE
P.O. Box 97022
Redmond, WA
98073-9722
206/885-2000
LIST PRICE: $725, Network 6-pock (six users) $995, Network Unlimited Pack $2695, R:bose Compiler $895; upgrode prices vory
REQUIREMENTS: 512K, two 3½-inch floppy drives (hord disk recommended), DOS 2.0 or loter version; 640K, DOS 3.1 or loter version for LAN version
TECHNICAL SUPPORT: 30 doys free support from doy of first coll, no toll-free number, M–Th 7–5, F 8:30–4
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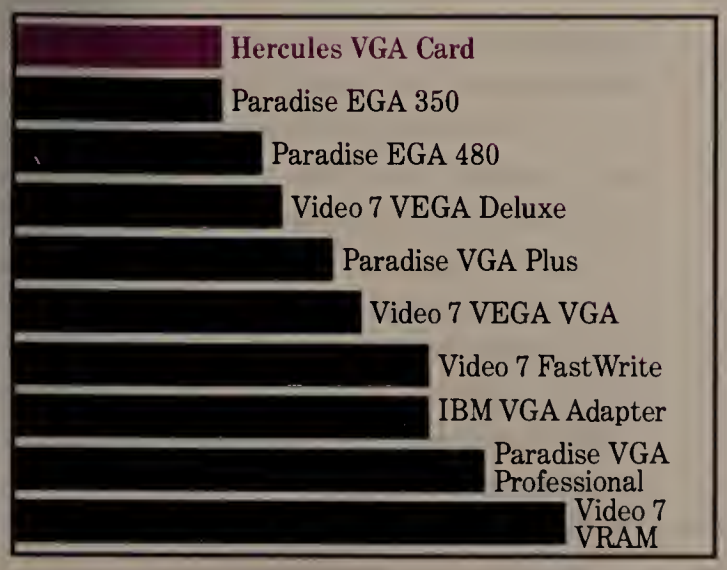

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Net Gains in Multiuser Accounting

Accounting software doesn't always get the scrutiny it deserves.

PC World puts seven multiuser accounting packages to the ultimate test—usability.

Ralph Soucie

Why should you consider running an accounting system on a network? Well, if your day-to-day accounting is currently a one-person operation, you probably shouldn't. On the other hand, if several people are using a manual system or a time-share computerized system, converting to network-based accounting could increase efficiency. One employee could enter cash receipts while another entered invoices from suppliers. Beyond that, a third person could respond to inquiries from customers about account history, or from top management about interim financial results, without interrupting anybody else's work.

Multiuser accounting products look and act the same as their single-user versions. In fact, with all the products we tested—*Accpac Plus, Great Plains Accounting Series, Harmony, M.A.S. 90 Evolution/2, RealWorld, SBT Database Accounting Library (Series 6 Plus),* and *Solomon III*—you can start with the single-user version and upgrade later, in most cases by installing a network manager module.

The only difference is the occasional 'You can't perform this procedure right now, because another user has access to that file' message. Though the tested programs implement their file- and record-locking routines in subtly different ways, the practical differences are minor.

All the products reviewed here deliver the accounting muscle you would expect from a powerful system. Distinctions show up mostly at the margins, in areas like recurring invoices and vouchers, password protection, reporting, and special convenience features.

Torture Testing on a Network

Most of the products tested are sold mainly through specialized dealers or value-added resellers, who charge thousands of dollars for installation and support. However, a business that has knowledge of DOS and accounting, and a spirit of adventure, will find that it is possible—although challenging—to do the installation in-house.

We simplified the process by installing and testing only the "big three" accounting modules: general ledger, accounts receivable, and accounts payable. But if the key to your accounting system lies outside this basic triad, see **TABLE 1** for a list of programs and prices.

To put the packages through their paces, we invented a fairly typical business scenar-

io, created a raft of test transactions, and entered them into each program. Next, we took each program through the full accounting cycle for a three-month period, including designing and printing an income statement. In stepping through this procedure, we noted the presence or absence of dozens of features; our observations are summarized in the Features Evaluation.

As we posted transactions, we saw that the programs use a variety of methods to trace transactions back to source documents; we noted several minor deficiencies (see the sidebar "What to Look For in an Audit Trail").

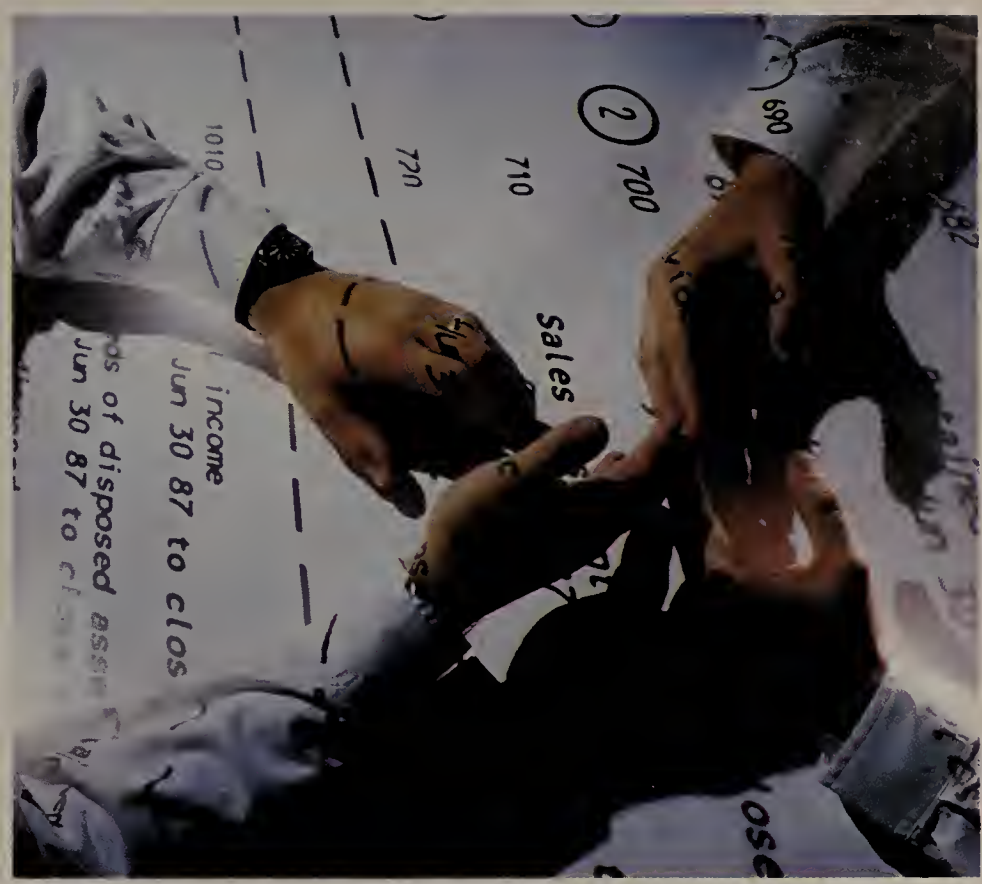
To simulate the way most accounting staffs work under typical office pressures, we deliberately avoided consulting the manual unless absolutely necessary. If a program wasted our time, it earned demerits; and we carefully evaluated the on-line help.

Not surprisingly, we found that the perfect accounting program doesn't exist. For the mythical average user, however, *M.A.S. 90* rates a Best Buy. But it faces stiff competition from *Accpac Plus* and *Solomon III* in terms of sheer power and from *Harmony* because of the latter's well-designed interface.

Accpac Plus 5.0

Computer Associates' *Accpac Plus* is a full-featured package that offers flexible reporting and some unique customization capabilities. It is also reasonably easy to use, although its power features are not always as accessible as they might be.

Installing *Accpac Plus* in single-user mode is generally easy, if a bit unorthodox. Company setup is a breeze no matter how many companies you have. Network installation is more straightforward than with most of the other packages.



ROBERT CARDIN

Accpac Plus's pop-up menus are clear and intuitive. Nifty features include an on-line help system that is both context sensitive and indexed. *Accpac Plus*'s Windowing System Manager contains a number of impressive innovations like task switching, macros, and custom-designed data validation.

The accounts receivable and accounts payable modules should work just fine for most users, but they are a tad less sophisticated than those of *M.A.S. 90* and *Solomon III*. *Accpac*'s modules could also benefit from a stronger warning against purging transaction detail in accounts receivable and accounts payable before posting batches to the general ledger. Financial statements are extremely flexible, although setting them up is time-consuming.

Accpac Plus's large installed base among CPA firms testifies to the strength of its general ledger module. Power users will like the customization capability, and most users will be comforted by Computer Associates' size, strong earnings, and visible commitment to the accounting market. The accounts receivable and accounts payable modules, though, limit *Accpac Plus* to a tie with *Solomon III* for the runner-up slot.

Great Plains earns a high rating for its excellent documentation and ease of use.

EXECUTIVE SUMMARY

Accpac Plus 5.0

Multiuser accounting software

Strang reparting and custamizatian capability make Accpac *Plus* ane af the tap chaices far paw-er users, althaugh its accaunts receivable madule is nat as capable as same af the athers.

	POOR	FAIR	GOOD	EXCELLENT
Multiuser features			●	
General ledger				●
Accounts receivable			●	
Accounts payable			●	
Reporting				●
Overall value			●	

Reader service no. 640

Great Plains Accounting Series 5.0

Great Plains combines ease of use with fine documentation and versatility. In some areas, such as financial reporting, it is only an average performer, but it has no serious deficiencies.

Single-user installation is fast and painless, but network installation and setting up a second company are both a little confusing.

EXECUTIVE SUMMARY

Great Plains Accounting Series 5.0

Multiuser accounting software

Great Plains' fine documentatian and technical suppart will appeal ta less saphisticated users, and its ambitiaus accaunt structure will be useful ta large arganizatians. But its reparting isn't strang enaugh ta challenge the leaders'.

	POOR	FAIR	GOOD	EXCELLENT
Multiuser features		●		
General ledger				●
Accaunts receivable			●	
Accounts payable			●	
Reporting			●	
Overall value			●	

Reader service na. 641

Great Plains' account numbers are generous, enabling you to track performance by department and region and still use subaccounts. The system also lets you set up a wide variety of global preferences such as automatic decimal-point entry and suppression of pop-up windows.

Great Plains' system for handling transaction batches, combined with its function-level password security, facilitates control in businesses with large accounting departments. The program handles recurring batches deftly, and you can assign mnemonic names to batches.

Posting transactions in *Great Plains* involves more steps than in any of the other programs. All disbursements except manually written checks are posted via a separate menu item. When one person is doing this, other users are locked out of most program functions, a precaution that promotes accuracy and data integrity. Impatient types might chafe at such a regimented system, but posting goes much faster when the CPU is relieved of multiuser responsibilities.

Great Plains' accounts receivable module is solid, handling payment terms and sales commissions with particular finesse. One quibble, though—you can't place vendors on hold-payment status.

Great Plains' financial statement editor is just fine for meat-and-potatoes reporting, and it includes strong support for FASB 95 (Statement of Changes in Financial Position). However, unlike most of the other products tested, it can't store multiple statement formats without the optional report writer, and editing report specifications is not as convenient as it could be.

Great Plains earns a high rating for its excellent documentation and ease of use, but limited reporting puts it a notch below the top-rated products.

Harmony 2.1

Open Systems did a clever thing with *Harmony:* The company built in most of the features found in its more powerful competitors, sacrificing relatively minor refinements for

TABLE 1

Pick a Module, Any Module

A cost comparison of key modules. Most vendors also offer customized vertical applications through third-party dealers.

Module[1]	Accpac Plus	Great Plains	Harmony	M.A.S. 90	RealWorld	SBT[2]	Solomon III
System manager	$590[3]	$995[4]	$99/$199	$95/$695	$195/$495		$95/$795[5]
General ledger	$795	$795	$399	$795	$695/$795	$395/$595	$795
Accounts receivable	$795	$795	$399	$795	$695/$795	$395/$595[6]	$795
Accounts payable	$795	$795	$399	$795	$695/$795	$395/$595	$795
Payroll	$795	$795	$599	$795	$695/$795	$395/$595	$795
Inventory	$795	$795	$599	$795	$695/$795	Y[7]	$795
Order entry	$795	$795	$599	$795	$695/$795	$395/$595	$695
Job cost	$795	$995		$995	$695/$795	$395/$595	$995
Sales analysis	$495				$350/$400		$295
Purchase order		$795		$795	$695/$795	$395/$595	$695
Fixed assets						$395/$595	$795
Report writer	$195	$595	$199				$695
Retail invoicing	$795						
Time and billing	$995					$395/$595	
Graphics reporting	$149	$595					
Import/export		$495	$79	$295			$695
Backup			$79			$65	
Word processor			$99				
Spreadsheet			$99				
Bank reconciliation				$195	$230/$265		
Data base reporter							$695
Address and mailing list							$195
Tutorial							$149

[1] Prices apply to single-user and multiuser version of module; where prices differ, both are listed.
[2] Also requires dBASE, Foxbase, or Clipper.
[3] Price includes $195 Windowing System Manager and $395 Lanpak System Manager; OS/2 System Manager is $295.
[4] System manager not required for single-user version.
[5] $795 includes up to five workstations; additional workstations are $795 per five.
[6] Price includes $70 dInvoice and $225 dStatements as well as the cost of source code.
[7] Included in dInvoice.

significant gains in ease of use. The result is an easy-to-use program that should satisfy most network users. At press time, Open Systems announced two new upgrades: *Harmony 2.2* and *Open Systems Accounting Software 3.5*, the company's more powerful product. *Harmony 2.2* will feature enhancements to the system manager and more financial reporting capabilities, among other additions.

Harmony's password security exemplifies the package's design philosophy. Although the program does not provide the security levels available in many other programs, it makes granting access to program functions on an individual basis convenient enough that most managers won't notice the limitations.

Installing *Harmony* on a stand-alone machine and setting up multiple companies is easy, but network installation is complicated. However, *Harmony*'s menus are readily understandable, and the program exploits the function keys better than any other product in the group.

Harmony's transaction-entry and inquiry screens are congenial. You can add new vendors and customers while entering transac-

Harmony's menus are readily understandable, and the program exploits the function keys better than any other product.

FEATURES EVALUATION

Multiuser Accounting: Not Too Different at the Top

Most high-end accounting systems are rich in features, but M.A.S. 90 wins a Best Buy rating because it makes power features especially accessible.

● Yes ○ No ◒ Deficient
▼ Limited only by available disk space

	Accpac Plus	Great Plains	Harmony	M.A.S. 90	RealWorld	SBT	Solomon III
Standard features							
Price[1]	$2975	$3380	$1396	$3080	$2880	$1785[2]	3180
Multiuser and security features							
Maximum users	100[3]	▼	▼	▼	▼	254[4]	30[5]
System- and function-level password protection	●	●	●	●	●	●	●
Password security groups or levels	●	○	○	●	○	●	○
Integrated backup utility	○	○	●	●	○	◒[6]	●
Dedicated server required	○	○	○	○	○	○	●
Runs on a Novell network	●	●	●	●	●	●	●
Runs on a 3Com network	●	●	●	○	○	●	○
Runs on an IBM PC LAN	●	●	○	○	○	●	○
Read-only access while file is locked	●	○	○	○	●	○	○
General ledger							
Maximum number of accounts	65,535	▼	▼	▼	▼	▼	▼
Maximum number of transactions in the data base	65,535	▼	▼	▼	▼	▼	▼
Highest account balance (digits, not including cents)	9	12	13	9	12	9	11
Maximum departments	65,535	999	99	99	▼	999	▼
Maximum companies	▼	▼	▼	▼	▼	99	▼
Maximum open periods[7]	26	13	13	13	13	1	13
Maximum digits in account numbers	12	11	12	9	16	8	12
Maximum segments in account numbers	2	4	2	3	2	2	2
Multicompany consolidations	●	●	◒[8]	●	●	●	●
Full-screen editing of journal entries	○	●	●	●	○	●	●
Lookup windows	●	●	●	●	○	○	●
On-line help	●	●	●	●	●	○	●
Exports 1-2-3 files	●	◒[8]	◒[8]	●	◒[8]	●	◒[8]
Exports ASCII files	●	●	◒[8]	●	●	●	◒[8]
Macro or other customization facility	●	○	○	◒[9]	●	○[10]	○
Accounts receivable							
Maximum customers or data base transactions	65,535	▼	▼	▼	▼	▼	▼
Maximum digits in customer number	6	7	6	7	6	6	6
Handles balance-forward and open-item customers	●	●	●	●	●	●[11]	●
Prints invoices	◒[8]	◒[8]	◒[8]	●	○	●	◒[8]
Can automatically apply payments to oldest open invoice(s)	●	●	●	●	●	●	●
Date-triggered recurring charges	○	○	○	◒[12]	◒[13]	●	●

tions. In addition, the accounts payable and accounts receivable reports are informative and accessible. However, the accounts payable module has fewer power features than do the other programs.

The ease of posting transactions to the general ledger might cause cautious types to flinch. In this respect *Harmony* lies at the opposite end of the scale from *Great Plains*. Another foible: *Harmony*'s 1099 processing is inelegant.

	Accpac Plus	Great Plains	Harmony	M.A.S. 90	RealWorld	SBT	Solomon III
Accounts receivable (continued)							
User-triggered recurring charges	●	●	●	●	●	●	●
Automatically computes discounts for early payment	○	●	●	●	●	●	●
Optional compounding of finance charges	○	●	●	●	●	●	●
Number of past-due intervals for aging	3	3	4	4	3	4	3
Automatically computes sales tax	◒[8]	◒[8]	◒[8]	●	●	●	●
Age-dependent dunning notices	●	●	◒[14]	●	●	●	●
User-designed customer statements	●	●	○	●	○	○	○
Default G/L account can be specified for each customer	○	○	○	○	○	●	●
Accounts payable							
Maximum vendors or data base transactions	65,535	▼	▼	▼	▼	▼	▼
Can automatically apply payments to oldest open invoice(s)	●	●	●	●	○	●	●
Vendor-specific payment terms	●	●	●	●	●	●	●
Checks for redundant invoices	●	●	◒[15]	●	●	●	●
Reconciles checks	●	○	●	◒[8]	◒[8]	●	●
Can hold payments to specified vendors	●	◒[16]	◒[16]	●	●	●	●
Prevents payments in excess of charges	●	○	○	●	●	●	●
Default G/L account can be specified for each vendor	●	●	○	●	●	●	●
Reporting							
Predesigned financial statement formats	●	●	●	●	◒[17]	●	◒[17]
Central over contents of columns for comparisons	●	●	●	●	●	○	●
Dollar rounding option	●	●	●	●	●	○	●
Support for FASB 95	●	●	◒[8]	●	●	●[18]	●
Automatic financial ratio summary	◒[8]	◒[8]	◒[8]	●	◒[8]	●	●
Data base reporter	◒[8]	◒[8]	◒[8]	●	◒[8]	○[10]	◒[8]
Combined cash receipts/disbursements projection	○	●	○	●	○	○	○
Sales analysis by customer	◒[8]	●	●	●	◒[8]	●	◒[8]
Mailing labels	●	●	◒[8]	●	○	●	◒[8]
Optional graphics module available	●	●	○	○	●	○[10]	●

[1]Prices listed are for a multiuser system including general ledger, accounts receivable, and accounts payable modules.
[2]Price does not include cost of a data base such as dBASE, Foxbase, or Clipper.
[3]Depends on network software brand and version, and number of servers.
[4]Per module.
[5]Maximum 15 per company, to a total of 30.
[6]Included in $65 menu and backup utility.
[7]Without special procedures.
[8]With extra-cost module.
[9]Generally provided to resellers only.
[10]Because SBT is written in dBASE code, the product can be extensively customized.
[11]Balance-forward billing is handled by dProfessional module only.
[12]Recurring batches can be assigned codes for selection purposes but are not automatically triggered by date.
[13]The program can limit the number of times an entry can recur, but user intervention is required to trigger the entry.
[14]Boilerplate text cannot be stored—it must be entered each time you print statements.
[15]Only if you try to pay a vendor more than once in the same accounting period.
[16]Holds payments on individual invoices only.
[17]Many formats are provided, but unless the user's chart of accounts closely follows the numbering scheme in the sample data, extensive revision is necessary.
[18]To be released soon.

Designing financial statements is easy, but your control over the content and appearance of the columns in the income statement is somewhat limited. More demanding users may have to resort to *Harmony*'s $99 word processing module. *Harmony*'s documentation deserves high marks for simplicity, although it is too lean in some spots.

Harmony's only serious drawbacks are the lack of a few power features and the relatively meager selection of optional modules.

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Although less powerful than *M.A.S. 90*, *Accpac Plus*, and *Solomon*, *Harmony*'s low cost and friendly interface make it an excellent multiuser accounting solution.

EXECUTIVE SUMMARY

Harmony 2.1

Multiuser accounting software

Harmony is the ideal product for a three- or four-person accounting department. Although it lacks some power features, it is very easy to learn and use and requires less start-up time than any product in its class.

	POOR	FAIR	GOOD	EXCELLENT
Multiuser features			●	
General ledger			●	
Accounts receivable			●	
Accounts payable		●		
Reporting			●	
Overall value			●	

Reader service no. 642

M.A.S. 90 Evolution/2 1.0x

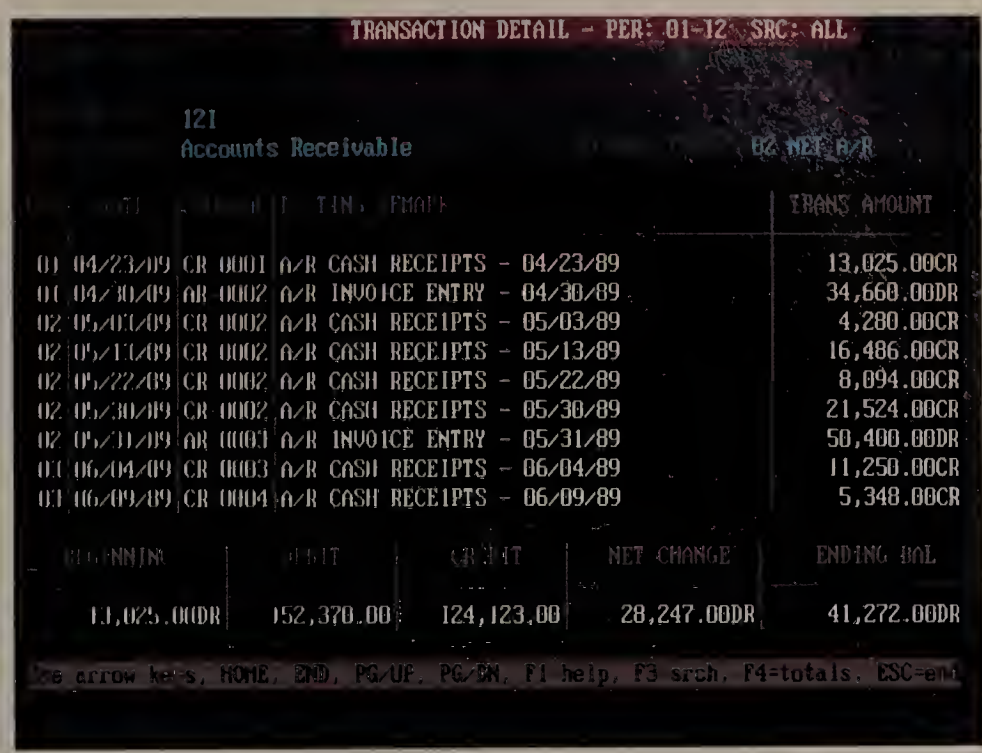
M.A.S. 90 features a well-designed menu system, a good all-around mix of features, and some important extras, adding up to one of the best values available for power-hungry users.

Installation and initial company setup are very easy, although setting up a second company is more challenging. *M.A.S. 90*'s menus are the friendliest of the bunch, thanks mainly to their sensible, consistent terminology. The absence of such common terms as *post* and *batch* might cause traditionalists to lose their bearings at first, but the system is fundamentally sound.

General ledger account numbers can contain 9 characters and be divided into 3 segments. Account inquiry is superb. You can view activity by period (with optional comparisons to budget or prior-year amounts) or by transaction.

Password security is strong, supporting security groups. A faint discordant note, though, is struck by *M.A.S. 90*'s file- and record-locking routines. A conflict between two workstations often prevents the second user from doing anything productive until the first user releases the file that generated the conflict.

The accounts receivable and accounts payable modules offer superb flexibility and power features. Moreover, of the tested products, *M.A.S. 90* is one of only two that include invoice printing in the accounts receivable module.



You can view general ledger activity in M.A.S. 90 by batch totals (shown above) or by monthly totals in your choice of three formats. Note also the year-to-date activity totals shown near the bottom.

EXECUTIVE SUMMARY

M.A.S. 90 Evolution/2 1.0x

Multiuser accounting software

BEST BUY

M.A.S. 90 offers an impressive combination of power and convenience. Outstanding management reporting, ease of use, and a knack for displaying the right information at the right time put *M.A.S. 90* at the top of the heap.

	POOR	FAIR	GOOD	EXCELLENT
Multiuser features			●	
General ledger				●
Accounts receivable				●
Accounts payable				●
Reporting				●
Overall value				●

Reader service no. 643

Financial reporting is also very strong. Though *Accpac Plus* and *Solomon III* are equally flexible, *M.A.S. 90* tops the field in automating the report design process. Its General Ledger Analysis Report, summarizing key comparative figures and ratios, is outstanding. Throw in the data base reporter that comes with the system manager module, and *M.A.S. 90* is the clear leader.

M.A.S. 90's on-line help is also tops, though more help screens in the financial report design area of the program would be welcome. On the whole, *M.A.S. 90* provides the best combination of power and convenience in this very competitive field, earning our Best Buy recommendation.

RealWorld 5.0

RealWorld is a capable package that has developed a strong third-party following. It offers the soundest audit trail and a wide range of options in all three modules. Single-user and network installation are both very easy, but adding a second company is a confusing process.

The current version of *RealWorld* adds optional pulldown menus to its old multilevel system. The menus are not as effective as *M.A.S. 90*'s (too many options in the top level), but they improve on the old system's mainframe feel.

Generous spacing makes *RealWorld*'s input screens easy to read, but you can see only one line of a transaction at a time. You can do partial-name searches, but lookup windows are not available.

On-line transaction inquiry screens are well designed and are available from the main menu of each module. The program offers more convenience than any other in keeping transaction history available for inquiry without wasting disk space.

One minor quibble with the multiuser version: If you pull up a record that's being edited by another user, you're not informed that that record is locked until you try to save your changes. When the record is released, you must reenter the changes—a real time waster.

Financial statement design, a weak spot in the previous version, has been shored up. Flexibility in specifying columnar content is still limited, but *RealWorld* supports FASB 95 very well. The concepts of report layouts and specifications may confuse new users initially, but the system is logical once it becomes familiar.

RealWorld has also added the ability to interrupt one process temporarily while performing another, somewhat like *Accpac Plus*. Trouble is, it's rather easy to exit the program accidentally while doing this. You can

EXECUTIVE SUMMARY

RealWorld 5.0

Multiuser accounting software

RealWorld is a fine product, but it's not as packed with convenience features as most of its competitors. Users who require customized accounting, though, should investigate *RealWorld*'s third-party vertical options.

	POOR	FAIR	GOOD	EXCELLENT
Multiuser features			●	
General ledger				●
Accounts receivable				●
Accounts payable				●
Reporting				●
Overall value				●

Reader service no. 644

In RealWorld's general ledger transaction inquiry screen, the <F2> key conveniently toggles between displaying the transaction description (shown below) and showing the source journal and reference number.

```
RealWorld - A/R A/P G/L CTL 00
Account: 0211  Accounts payable                          07/01/89 to 07/31/89

 Date          DR amount        CR amount Reference                  Corrctn
04/07/89                        5,600.00 Eastasia Importers Ltd.       ▌
04/08/89        4,380.00                 Eastasia Importers Ltd.
04/08/89          580.00                 Pacific Gas & Electric
04/17/89        5,600.00                 Eastasia Importers Ltd.
04/17/89        6,834.00                 Star Manufacturing Co.
04/17/89        6,420.00                 Future Fashions, Inc.
04/17/89                        5,400.00 Star Manufacturing Co.
04/17/89                        6,420.00 Future Fashions, Inc.
04/25/89                        8,800.00 Eastasia Importers Ltd.
04/25/89                          628.00 Pacific Gas & Electric
05/04/89        8,800.00                 Eastasia Importers Ltd.
05/05/89                        8,400.00 Eastasia Importers Ltd.
05/05/89                        4,520.00 Star Manufacturing Co.
05/07/89        5,400.00                 Star Manufacturing Co.

                Total DR        Total CR Beg bal              11,794.00CR
               82,250.00       87,722.00 Net change            5,472.00CR
                                         Ending bal           17,266.00CR
Press ↑ or ↓, PgUp or PgDn, then answer Y or N to mark entry as correction.
Press F1 to select next account, F2 to see source and document #, ESC to exit.
```

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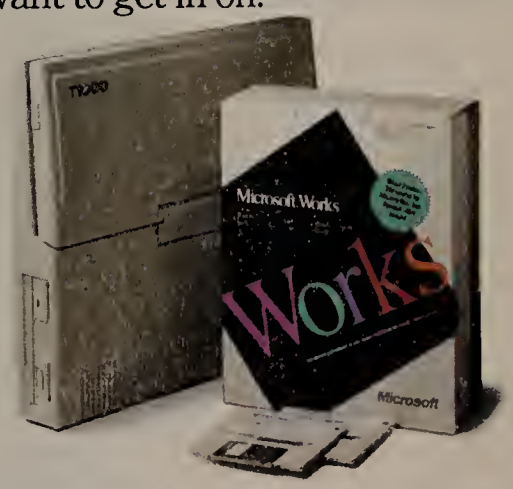

T1000: Battery-powered 80C88/4.77 MHz, 720KB 3½" floppy drive, 512KB RAM expandable to 1.2MB, super-twist LCD display, MS-DOS 2.11 in ROM, built-in RGB, Parallel serial and external drive ports. Offer good through 12/31/89. Microsoft and Microsoft logo are registered trademarks of Microsoft Corp.

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also link several menu options into an "access group" that allows tunneling back and forth between operations, which could reduce learning time for inexperienced personnel.

RealWorld doesn't exactly bristle with features, but it is a stable, solid-citizen type of product. Users with special needs would do well to consult the RealWorld *Red Book*, a catalog of vertical-market solutions offered by third parties. As a general accounting package, *RealWorld* is perfectly competent, but it's a shade behind the leaders.

One bonus for purveyors of goods is STB's inclusion of invoicing and inventory control.

SBT Series 6 Plus 6.2

SBT Series 6 Plus 6.2 is unique among the tested group in that it is written in dBASE code, making it easily customizable by knowledgeable dBASE consultants. It's also reasonably priced, especially if you already own *dBASE*, *Foxbase*, or *Clipper*. Unfortunately, *SBT* requires too many trade-offs in convenience to be recommended for general-purpose accounting.

SBT Series 6 is written in *dBASE III Plus*. However, using a special utility, it ran just fine in tests with *dBASE IV;* installation was complicated somewhat by the need to compile the *dBASE IV* code, though. A forthcoming upgrade, *Series 7*, will be written especially for *dBASE IV*.

EXECUTIVE SUMMARY

SBT Series 6 Plus 6.2

Multiuser accounting software

SBT is not as convenient as the other packages, so it's a serious candidate only for those who need special modifications that are not available elsewhere.

	POOR	FAIR	GOOD	EXCELLENT
Multiuser features			●	
General ledger		●		
Accounts receivable			●	
Accounts payable			●	
Reporting		●		
Overall value		●		

Reader service no. 645

SBT's menus and input screens are not as intuitive as the other programs'. There are few submenus, and most main menu options lead directly to input screens. *SBT* also lacks on-line help and lookup windows.

SBT's account codes must contain at least 5 digits, which will annoy users who need only 3 or 4. Unlike all the other programs, *SBT* allows only one open period.

If you use *dBASE IV* and *SBT* on a network, speed is another problem. *SBT* accesses the disk much more frequently than the other programs and consequently was noticeably slower even on an 80386-based PC. However, the program is certain to run much faster if compiled by *Foxbase* or *Clipper*.

One bonus for purveyors of goods is *SBT*'s inclusion of invoicing and inventory control in the accounts receivable module. In the accounts payable module you can assign each vendor a payment priority code, which comes in handy when funds get tight.

Unlike most of the products tested, *SBT* can generate an automatic ratio analysis report. It does not provide a facility for designing custom financial statements, though naturally people familiar with dBASE can design reports to their heart's content.

SBT's overall design is mediocre, however. Unless you really need customization, you're better off with one of the stand-alone packages.

Solomon III 5.0

TLB's *Solomon III* is strong across the board, although it may not suit smaller users. An ambitious data base orientation makes for powerful reporting, and the program is also reasonably easy to use, thanks to logical menus and crisp documentation.

Solomon III's setup routine is tedious. By reading the manual carefully, you can get through setup without major problems, but chances are good you'll burn up your one free technical support call during this phase.

Solomon III was the only program that wouldn't run in multiuser mode on *PC World*'s test network, which included Novell's *ELS I* network software (version 2.0a). TLB states that *Solomon III* is compatible with Novell's higher-level *ELS II*, *Advanced NetWare*, and *SFT* operating system versions.

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RealWorld, M.A.S. 90, and Solomon III provide the best blend of error prevention and convenience in their audit trails.

What to Look For in an Audit Trail

Where did that number come from? Sooner or later, that question haunts every accountant, and the audit trail holds the answer.

A good electronic audit trail provides dates and unique system-generated numbers for tracing transactions in the general ledger report back to their source journals. All the packages we tested do this, with very minor exceptions.

Because the general ledger listing links your accounting records with the original source document, it's vital to print the listing as the transactions are posted. *Solomon III, M.A.S. 90,* and *RealWorld* emphatically require you to print the listings. However, several of the programs are surprisingly lax on this score. *Great Plains, Accpac Plus,* and *Harmony* let you post entries without creating hard copies of the related transaction listings. *Great Plains* and *Accpac Plus* allow you to print the listings to the screen. With *Harmony,* you can turn the printer off and quit the print procedure. *SBT* is even looser. It simply provides an option not to print the entries, although the general journal is automatically printed when you close the period in the general ledger.

All the packages produce useful, comprehensible general ledger reports. *M.A.S. 90* and *Accpac Plus* deserve special credit for showing summary batch totals instead of individual transactions. *SBT's* general ledger, on the other hand, is a bit too summarized.

All told, *RealWorld, M.A.S. 90,* and *Solomon III,* in that order, provide the best blend of error prevention and convenience in their audit trails. The other programs performed satisfactorily with minor differences at the margins. *SBT,* because of the ease with which you can foil forced printing, trails the pack in this area. —*R. S.*

Users on small networks may be dismayed to learn that *Solomon*'s multiuser version requires a dedicated server.

Once you install *Solomon III,* you can't help but admire its sophistication. It blends good menus, on-line help, and documentation into a brisk, no-nonsense package.

Competitors like *Accpac Plus* and *M.A.S. 90* have as many features, but *Solomon III* distinguishes itself by the extent and variety of data it can capture. For example, *Solomon III* has 70 fields in its customer records, whereas *Accpac Plus* has only 25. Moreover, *Solomon III* offers three optional modules designed to slice, dice, and reformat information from your accounting data base.

Though account numbers can contain two segments at most, any character in any account number can be used as a sort field, giving you tremendous flexibility in defining profit centers. *Solomon III*'s voracious appetite for information has a downside, though—it asks for a lot of input that may not be useful without such extra modules as Order Entry, Job Cost, or Sales Analysis. And while *Solomon III*'s menus are well designed, its input screens have a busy, congested look.

Validity checking is superb, but *Solomon III*'s finickiness can be frustrating. For example, the program occasionally took up to 30 seconds on a 16-MHz 80386 to respond to inappropriate entries in certain fields.

Solomon III's financial reporting is roughly on a par with *Accpac Plus*'s in flexibility and ease of use. *Accpac Plus*'s system may be a bit more convenient, but *Solomon III*'s financial ratios report balances that out.

Taken together, *Solomon III*'s documentation and on-line help are excellent, and if yours is a highly structured outfit that plans

EXECUTIVE SUMMARY

Solomon III 5.0

Multiuser accounting software

Solomon III's turf is the power user. If carefully cultivated, its data base yields a rich harvest of financial information. However, small-network users may get bogged down by the program's complex input screens and its requirement of a dedicated server.

	POOR	FAIR	GOOD	EXCELLENT
Multiuser features		●		
General ledger				●
Accounts receivable				●
Accounts payable				●
Reporting				●
Overall value			●	

Reader service no. 646

When investing in Accounting Software, it's wise to seek a second opinion.

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"Comprehensive and well designed, Macola Accounting Software is at the top of its class."

— PC Magazine

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"The package is fast in both stand-alone and network versions."

— LAN Magazine

The Bottom Line. Macola is a wise investment. All major accounting firms recommend the software. But PC Magazine said it best when they gave Macola their last Editor's Choice designation for accounting software. "Managers of growing businesses...can be confident that their companies will not outgrow the software."

If Macola sounds like the kind of accounting software you want working for your company, call us today toll-free for more information and a personal demonstration.

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on using at least six modules, *Solomon III* bests the field in terms of total automation. But the program's officious demeanor and requirement of a dedicated server for multiple users prevent it from challenging *M.A.S. 90* for a Best Buy rating.

A Tough Race Between Top Contenders

M.A.S. 90 is proficient in every area, with flexible reporting and overall ease of use that earn it our Best Buy. *Solomon III* is equally powerful, but its network hardware requirements render it less suitable for smaller accounting departments. *Accpac Plus*'s customization capability should be a big hit with people who take the time to use it, though the program's unambitious accounts receivable and accounts payable modules might leave some users wanting more.

The other four products are less powerful and have more limited appeal. *RealWorld*'s major strengths are its large selection of third-party modules and its custom menu capability. User-friendly *Harmony* is a superb choice for users who don't need the power of the leaders; it yields a slice at the top of that range to *Great Plains*, which combines sophisticated batch handling with fine documentation but can't quite match the power of the leaders. *SBT* is the fallback choice for users whose special needs preclude broad-spectrum accounting products and whose budgets rule out a completely custom-designed system. ●

Ralph Soucie is a CPA and consultant with Brian Murphy & Associates in Lake Oswego, Oregon, and a contributing editor to PC World.

WHERE TO BUY

Accpac Plus 5.0
Computer Associates
1240 McKay Dr.
San Jose, CA 95131
800/531-5236,
408/432-1727
REQUIREMENTS: hard disk, 512K, DOS 3.1 or later version or OS/2
TECHNICAL SUPPORT: 30 days free, no toll-free number, M–F 7–5; annual support $195 per module for LAN system manager, general ledger, accounts receivable, and accounts payable; $145 per module if support is purchased within 30 days; support costs vary for other modules
OTHER SUPPORT: newsletter, user BBS on The Source, training through dealers and training companies
Reader service no. 640

Great Plains Accounting Series 5.0
Great Plains Software
1701 S.W. 38th St.
Fargo, ND 58103
800/345-3276,
701/281-0550
REQUIREMENTS: hard disk, 512K single user, 640K multiuser, DOS 3.1 or later version
TECHNICAL SUPPORT: 30 days free, toll-free number, M–F 8–7, S 10–2; PlainSupport (three free calls, then $30 per call or $125 prepaid for five calls) $250 per year; PlainSelect (unlimited phone support) $750 per year or $450 for six months; $50 in free products or services if call is not answered or returned in 1 to 3 hours (depending on the plan purchased)
OTHER SUPPORT: regional and on-site training; Great Explanations question-and-answer book $150
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Harmony 2.1
Open Systems
6477 City West Pkwy.
Eden Prairie, MN 55344
800/328-2276,
612/829-0011
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TECHNICAL SUPPORT: phone support $3.95/minute ($20 minimum), toll-free number, M–F 8–6; unlimited phone support $300 per year
OTHER SUPPORT: regional and on-site training
Reader service no. 642

M.A.S. 90 Evolution/2 1.0x
State of the Art
3545 Howard Way
Costa Mesa, CA 92626
800/854-3415,
800/422-2151 California
REQUIREMENTS: hard disk, 512K, DOS 3.1 or later version, printer
TECHNICAL SUPPORT: first phone call free, then $100 annual registration fee plus $25 for each 10-minute call; toll-free number, M–F 6:30–5:30; support usually provided through dealers
OTHER SUPPORT: Technical Reference and Support Guide sold through dealers
Reader service no. 643

RealWorld 5.0
RealWorld Corp.
282 Loudon Rd.
Concord, NH 03302
800/255-1115
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TECHNICAL SUPPORT: $175 per module for six months; phone support $120/hour ($30 minimum), no toll-free number, M–F 8:30–6:30
OTHER SUPPORT: training through dealers
Reader service no. 644

SBT Series 6 Plus 6.2
SBT Corp.
One Harbor Dr.
Sausalito, CA 94965
800/227-7193,
800/331-8998 California
REQUIREMENTS: hard disk, 512K single user, 640K multiuser, DOS 2.0 or later version
TECHNICAL SUPPORT: free, unlimited to registered users, no toll-free number, M–F 7–5, includes access to user BBS and updates; Executive Support Plan includes 3 hours support time (minimum call 5 minutes); remote support via modem; newsletter $395 per year
OTHER SUPPORT: regional and on-site training available
Reader service no. 645

Solomon III 5.0
TLB
1218 Commerce Pkwy.
Findlay, OH 45840
800/822-0444,
419/424-0422
REQUIREMENTS: hard disk, 512K, 640K for Database Reporter and Report & Graph Designer modules, DOS 3.2 or later version, printer
TECHNICAL SUPPORT: first phone call free, no toll-free number, M–F 9–6; annual support plan (includes unlimited phone support, access to company BBS, newsletter, and automatic upgrades) $695 for single-user version, $995 for up to five users; without annual plan, phone support $95/hour; technical bulletins and newsletter $40 per year
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Groupware: E-Mail Meets Scheduling

If LAN E-mail isn't enough, and you need group scheduling and productivity tools, welcome to the brave new world of groupware.

Paul Christiansen, Steve King, and Mark Munger

Linking the members of a LAN work group productively is a bigger job than coupling LAN cards and cables. This is the challenge taken up by a new category of LAN software called *groupware.*

Future groupware packages such as Lotus's *Notes* promise a variety of work-group productivity aids, including project tracking, document processing, and on-line conferencing. Today's fledgling contenders take a more modest approach. LAN E-mail packages at heart, they integrate group schedules, personal calendars, and other utilities to help coordinate meetings and keep projects on track.

All the packages reviewed here were judged according to two major criteria. First, they should offer strong messaging features—E-mail is crucial to any LAN. Second, they should streamline scheduling and project tracking, by means of either a group scheduler or taut integration of E-mail and personal calendars. After that, the more desktop accessories the merrier, as long as they don't slow performance, increase price, or make the program difficult to use.

If your department thrives on impromptu meetings, each with a different focus and cast of characters, group scheduling can be a strategic advantage. You can avoid postponed or poorly attended meetings and cut down on the message traffic involved in coordinating schedules. Three of the packages reviewed here—*Higgins 2.2* from Enable Software, *Office Works 1.1* from Data Access, and *WordPerfect Office 2.0* from WordPerfect—include group schedulers that let members view other members' calendars (without revealing personal details) and select a mutually convenient time. A good scheduler automatically posts invitations, sends responses back to the originator, and updates attendees' calendars. It should also schedule such resources as conference rooms, visual aids, and company cars.

If your schedules are less extemporaneous, Action Technologies' *The Coordinator II 1.1N* may be more suitable. It lacks group scheduling, but a tight fit between messaging and calendaring almost takes up the slack. For example, date-sensitive requests and meeting invitations automatically update personal calendars. *The Coordinator II* also provides greater privacy. (If users are so uneasy about exposing their appointments that they maintain a second calendar secure from prying eyes, a group scheduler becomes counterproductive.)

DENNIS POTOKAR

E-Mail Comes First

Scheduling may be the soul of groupware, but electronic mail is its heart. If like most users, you're counting on groupware to pull double duty as your E-mail workhorse, messaging features have top priority. If you don't need scheduling and other extras, you may be better off with the superior E-mail skills of standard packages such as *cc:Mail* or *The Network Courier* (see "LAN E-Mail: Power to the Work Group," *PCW*, November 1988).

Fortunately, all the programs reviewed here supply enough E-mail power to meet most needs. All let you send and receive messages, set up private and public mailing lists, forward and reply to mail, copy yourself and others, and attach formatted files. Some programs store messages in electronic folders—portfolios of related messages. Others lack in-box folders, but you can archive messages to disk files and affix keywords for easy retrieval. Some programs offer phone message forms so an operator can deliver messages instantly; others notify you when the recipient has read your message.

However, groupware's E-mail talents still need refining. None let you send blind carbon copies, generate graphics, or record and annotate captured screen snapshots as you can with *cc:Mail*. None of the text editors can compete with *cc:Mail;* some lack cut and paste, and others, automatic reformatting. Unlike most E-mail packages, none provide RAM-resident utilities to swap mail from within another application. However, all provide macros that let you switch to and from another program quickly, so when you receive a formatted file, you can view it in its native format. And all but *Office Works* come with TSRs that beep within other programs when mail arrives.

If you want to exchange mail with the outside world, only *The Coordinator II* and *Higgins* can match standard E-mail. Both link LANs that use the same groupware, swap mail with off-site modem users, and offer

FEATURES EVALUATION

Groupware Versus cc:Mail—Productivity Tools Challenge LAN E-Mail Power

WordPerfect Office excels at group scheduling and productivity aids, The Coordinator II integrates messaging and personal calendars, and Higgins and Office Works offer good organizational features. Yet their mail features don't match up to a dedicated E-mail package like cc:Mail.

● Yes
○ No
◒ Deficient

	The Coordinator II	Higgins	Office Works	WordPerfect Office	cc:Mail
Messaging					
Memory-resident message notification	◒	●	○	●	●
Memory-resident messaging	○	○	○	○	●
Return receipt	○	●	●	●	●
Blind carbon copies	○	○	○	○	●
Private mailing lists	●	●	●[1]	●	●
Public mailing lists	●	●	●	●	●
Phone messages	○	●	●	●	○
Threaded messages	●	○	○	○	○
Bulletin board	○	○	○	●	●
Split-screen interface	●	○	○	○	○
Attaches formatted files (number of files per message)	1	28	30	24	20
Text editing					
Automatic reformatting	○	●	●	●	●
ASCII file import/export	●	●	●	●	●
Block moves	●	○	○	●	●
Cut and paste from external file	●[2]	○	○	●[3]	●
Graphics utility	○	○	○	○	●
Screen shot utility	○	○	○	○	●
Message management					
Stores mail in folders	●	●[4]	●[4]	●[5]	●
Archives mail	●	●	●	○	●
Sorts mail by					
sender	●	●[6]	●[6]	○	●
date	●	●[6]	●[6]	●	●
date range	●	●[6]	●[6]	○	●
priority	●[7]	●[6]	○	○	○
subject	○	●[6]	●[6]	○	●
keyword	●	●[6]	●[6]	○	○
Document indexing and retrieval	○	●	●	○	○
File manager (DOS shell)	●	○	○	●	○
Jump to external application	●	●	●	●	●

	The Coordinator II	Higgins	Office Works	WordPerfect Office	cc:Mail
Connectivity					
MHS compatible	●	○	○	○	●[8]
Links with external networks running same mail package	●	●[8]	○	○	●[8]
Links with external mail systems	●[8]	●[8]	○	○	●[8]
Remote modem access	●[8]	●[8]	○	○	●[8]
Fax gateway	●[8]	●[8,9]	●[9]	○	●[8]
Calendaring					
Personal calendar	●	●	●	●	○
To-do list	●	●	○	●	○
Message annotation to calendar	●	●	○	●	○
Group scheduling					
Group scheduler	○	●[10]	●	●	○
Message annotation to group schedule	○	○	○	●	○
Resource scheduling	○	●	○	●	○
Suggests conflict-free meeting time	○	○	●	●	○
Meeting response updates personal calendar	○	○	●	●	○
Productivity utilities					
Multiuser address data base	○	●	●	●	○
Calculator	○	○	○	●	○
Macro editor	○	○	○	●	○
Programming editor	○	○	○	●	○
Expense reporter	○	●	○	○	○

[1] Administrators can extend mailing list rights to individual users.
[2] Only with ASCII files that you load into editor.
[3] Only with Shell-aware applications.
[4] No folders per se, but you can tag messages with searchable keywords.
[5] You save messages in directories, not folders, but you can retrieve all messages in a directory with one keystroke.
[6] Sorts only archived mail, not in-box mail.
[7] Sorts by response due date but not by numerical priority.
[8] Extra cost.
[9] Send only; can't receive faxes.
[10] View only; no automatic invitations or calendar updates.

gateways to external mail services such as MCI Mail and IBM PROFS. All but *WordPerfect Office* can send faxes.

Because E-mail is the logical home base for LAN users, having some *SideKick*-like utilities at the ready is a plus. Some groupware packages offer multiuser Rolodex-like card files, document indexing and retrieval, and accessories such as calculators and ex-

pense reporters. Yet an easy interface is more crucial than a bundle of accessories—because groupware is used regularly by both novices and power users, an intuitive interface is vital.

WordPerfect Office 2.0

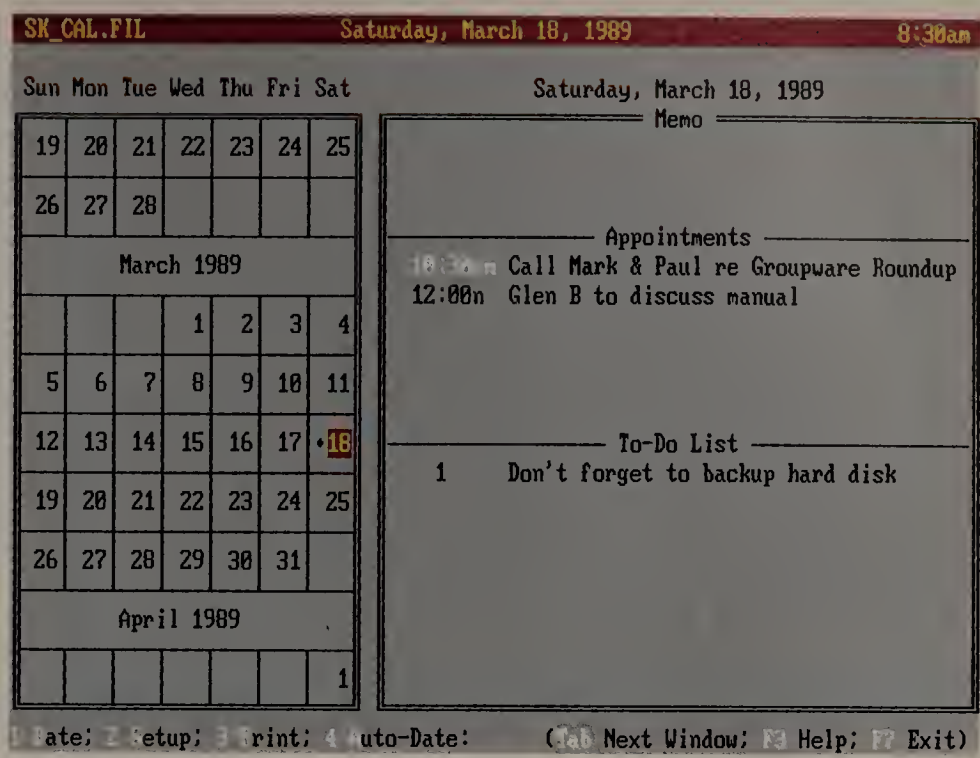
Take the *WordPerfect Library*, add superior E-mail and group scheduling, and you've got *WordPerfect Office*. It's a must for *WordPerfect* LANs, and it's a good deal for anyone who craves utilities. Although it lacks connectivity options, and for most LANs it's twice as expensive as its rivals ($495 for the server and $195 for each user), *WordPerfect Office* is the best value in the roundup.

WordPerfect Office provides impressive data integration with other applications. Each function is a separate program, but they're neatly linked through a menu front end. This 46K TSR lets you cut and paste between modules and with any *WordPerfect* program or other supported package such as *1-2-3* and *dBASE IV*. The other groupware programs let you create macros that jump to another application and back, but *WordPerfect Office* is the only one that lets you hot key to a particular location and return to the place you left off. Also, you can share macros with any *WordPerfect* application, and you get macro and programming editors.

The function-key interface is pure *WordPerfect*, a stretch for novices, but efficient once you get the hang of it. Fortunately, you're aided by on-line help, descriptive prompts, and a superb manual.

The group scheduler is the best in the roundup. You can select and modify an E-mail list for your meeting group and view personal calandars in a bar graph matrix. Appointment details are hidden, but time blocks are public. The program suggests a conflict-free time and posts invitations automatically. Acceptances update personal and group schedules, and the originator receives a confirmation. Any user can view meeting schedules set for a group, along with associated resources such as meeting rooms or equipment. The resource scheduler is the best reviewed, letting you assign usage priorities to users. It's the only package that lets you attach messages and files to meeting invitations, so attendees can arrive well prepared with agendas and background material.

WordPerfect Office's E-mail is limited by poor connectivity, yet its messaging skills are the best in the roundup. Like *cc:Mail*, it provides bulletin boards—public folders that offer a rudimentary form of on-line conferencing. The text editor, a scaled-down ver-



WordPerfect Office's personal calendars include to-do lists in addition to a standard appointment log.

EXECUTIVE SUMMARY

WordPerfect Office 2.0

Groupware package

WordPerfect Office delivers the best mix of E-mail, scheduling, and productivity tools in the roundup. Its macro links to other WordPerfect products make it a gem for WordPerfect LANs, and other users will appreciate the excellent group scheduler. Only a high price and lack of connectivity keep it from earning a Best Buy.

	POOR	FAIR	GOOD	EXCELLENT
Messaging and editing			●	
Message management			●	
Connectivity	●			
Calendaring			●	
Group scheduling				●
Productivity utilities				●
Overall value			●	

Reader service no. 663

```
Read  Compose  Calendar  Organize  File  Edit  Tools  Exit  Help

                    Conversation Status Report

 Subject                          new product
 Began with                       question on 13-Mar
   ...from                        me

                    History of dunderwo's question
  Dated                                          Subject
▶   8-Mar   Reminder          ->                  new product
   13-Mar   my       question -> pchristi        new product

              Calendar for Wed  8-Mar-89 to Wed 15-Mar-89
                Appointments, Reminders, & Conversations
  Wed  8-Mar-89
           reminder re   question by me          new product
  Fri 10-Mar-89
  pchristi to reply to   question by me          new product
  mmunger  to complete   request  by me          clean storage center
  I'm      to reply to   question by pchristi    Bio install results

Enter  Esc  Del  F1=Help  F10=Actions  /=Mark set    L:1    Thu  9-Mar 10 06am
```

With The Coordinator II, you can trace the history of all messages related to a particular project.

sion of *WordPerfect*, is mediocre (although better than its rivals), and mail management is limited—you can save mail in folders, but you can't sort it or archive messages.

The productivity utilities are tops. The multiuser card file lets you mail merge easily with *WordPerfect*, the calculator is excellent, and the DOS shell offers all the power of *Xtree Pro* without the graphic tree.

No *WordPerfect* LAN should be without *WordPerfect Office*, and the judicious mix of messaging, scheduling, and desk accessories will benefit most other LANs. Unfortunately, the inflexible pricing scheme and lack of external links make it a poor match for large networks.

The Coordinator II 1.1N

Unlike its rivals, *The Coordinator II* forces users to adopt a highly structured messaging doctrine. Every message must have a goal and a deadline, so you're constantly prodded to keep the work flowing. It's a tough row to hoe, but the productivity benefits are real. Although *The Coordinator II* lacks a true group scheduler, its strong link between E-mail and calendars helps streamline workgroup planning. The price is high for small LANs but reasonable for larger networks—$995 for 10 users, $1995 for 30, and $2995 for 50. Despite the lack of extras, *The Coordinator II*'s excellent messaging features place it a close second.

The Coordinator II formalizes E-mail conversations, making users take responsibility for their actions. E-mail is based on a standard set of message types, including requests, promises, and speculations. Depending on the type, the program generates a boilerplate opening that you can edit or erase, along with dated fields where you enter deadlines. The process drives your conversations toward a goal, but if you're not ready for this exacting discipline, you can turn off the message types and swap regular E-mail.

You can easily monitor projects, plan for meetings, and trace conversation threads back to their origins. For example, you can save all messages traffic linked to a specific project, either in folders or printed out as a status report.

Because you can't view your associates' calendars, it's more difficult to schedule meetings. However, you're kept up-to-date on key events. Your calendar is updated when you receive dated requests, and you can attach messages to scheduled appointments. The six-week calendar includes the usual monthly, weekly, and hourly entries as well daily to-do lists.

EXECUTIVE SUMMARY

The Coordinator II 1.1N

Groupware package

With its unique E-mail approach, *The Coordinator II* takes time to learn, but it can boost productivity. Good E-mail features, excellent connectivity options, and a tight integration of messaging and personal calendars offset the lack of a group scheduler.

	POOR	FAIR	GOOD	EXCELLENT
Messaging and editing			●	
Message management				●
Connectivity				●
Calendaring				●
Group scheduling	●			
Productivity utilities	●			
Overall value			●	

Reader service no. 660

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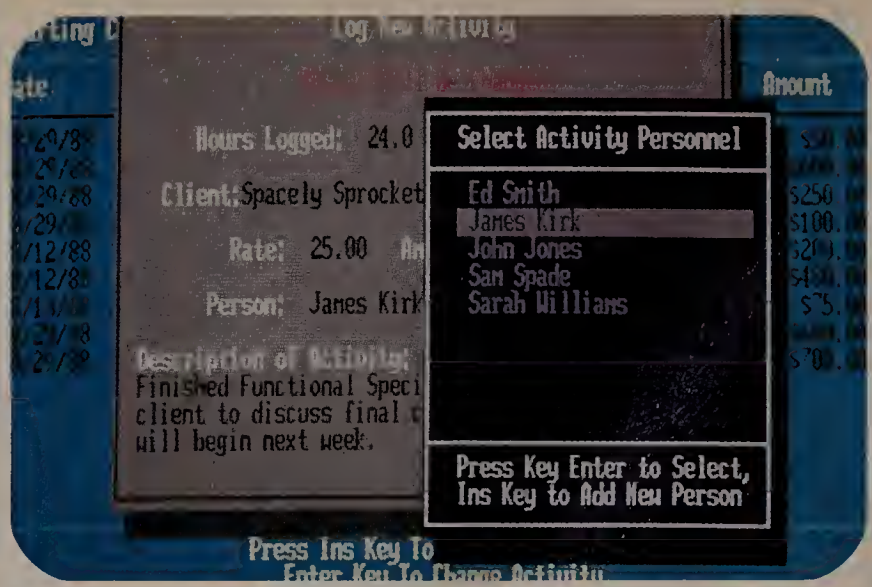

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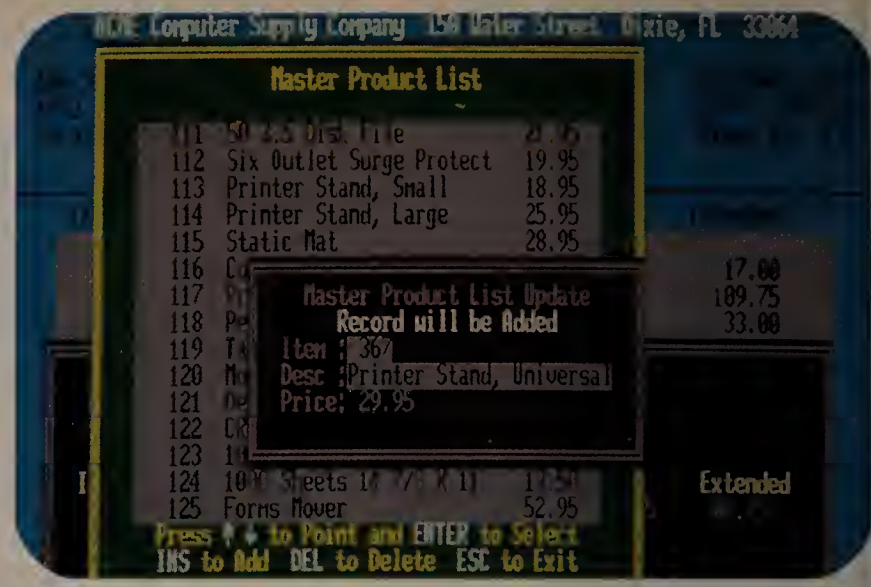

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Circle 38 on reader service card

The interface is superb, offering a *1-2-3*–like command line and well-designed menus and dialog boxes. You can start with a novice menu mode and move to a more detailed system augmented with hot keys. Unlike its rivals, *The Coordinator II* lets you split the screen and toggle between tasks. You can view your calendar while reading a message, for example, or read a message in one window while replying in another. However, the documentation is poorly written, and technical support costs extra.

The basic E-mail is capable but lacks return receipt and phone message forms. More limiting, you can attach only one file per message. However, you get excellent mail-sorting options, and connectivity is the best in the roundup. *The Coordinator II* includes Action Technologies' Message Handling Services (MHS), a protocol that's rapidly becoming an E-mail standard. With MHS, you can swap mail with other LANs running MHS-compatible packages such as *cc:Mail*, *Framework III*, and *Advanced NetWare*. You can also link two *Coordinator* LANs and buy options for remote access, fax transmission, and gateways to other services.

The Coordinator II takes time to master, but its intuitive interface smooths the way. A group scheduling option should be out by the time you read this, but even without it, the program is a good value.

Higgins 2.2

Enable Software's *Higgins* supplies solid E-mail and includes such extras as an expense reporter and document indexing. At $995 for 20 users, the price is right, but a weak menu system and group scheduler strike a sour note.

Higgins uses a *1-2-3*–like top-line menu, but execution is awkward. For example, to edit a field such as a calendar entry, you have to select the field, then select Modify from another menu, and then do your editing in a separate window.

The E-mail feature is first-rate. It excels at message management, giving you thorough headers with flags for private and urgent notes. *Higgins* offers a dual-password system: You can share one password with a secretary but use a second password to view files marked private. TSRs beep within other programs when you receive an urgent message or have an appointment.

You can't store messages in folders, but you can easily archive messages and attach keywords and other labels for later retrieval. You can also index any file on your PC and store it locally or on the server. You can tag and search messages by type, but unlike with *The Coordinator II*, you don't get canned openings, message threading, or calendar updates.

The five-week calendars deliver the best to-do lists in the roundup. You can assign priorities to items, attach to-do lists to schedules, and sort by project, due date, or status. However, the group scheduler is primitive. You can easily select invitees and view their calendars (details excluded) in a matrix, but you must study the matrix for conflicts and select a time yourself. Once you do, you have to switch to E-mail and send out invitations manually, and recipients must respond and update their calendars on their own. You can schedule resources, but you can't assign resource priorities to users.

Unlike its rivals, which keep calendar details private, *Higgins* allows managers to

EXECUTIVE SUMMARY

Higgins 2.2

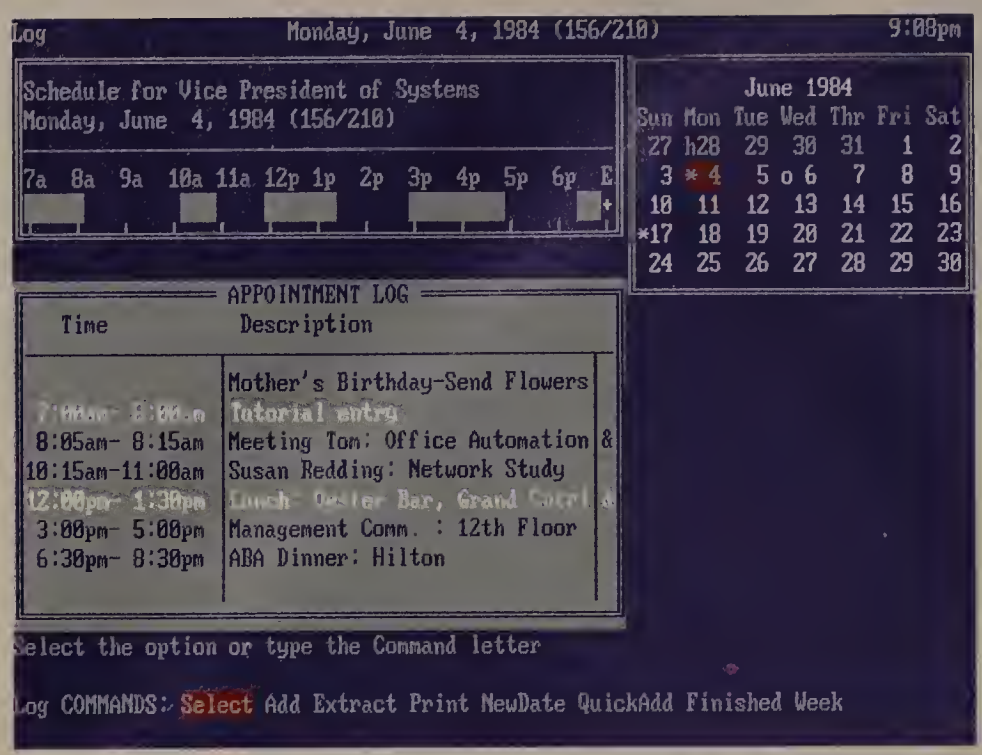
Groupware package

Despite superb E-mail, calendaring, and document retrieval, *Higgins* suffers from a difficult interface and a weak group scheduler.

	POOR	FAIR	GOOD	EXCELLENT
Messaging and editing			●	
Message management			●	
Connectivity			●	
Calendaring				●
Group scheduling		●		
Productivity utilities			●	
Overall value			●	

Reader service no. 661

The Coordinator II takes time to master, but its intuitive interface smooths the way.



Higgins' personal calendar offers several levels of detail to keep track of your schedule.

snoop. With the proper password, you can reach across the LAN to view any details that aren't specifically masked by the user.

Higgins' address data base is superior. It's the only program that lets you attach to-do lists, messages, faxes, and formatted files to names so you can view all elements linked to an individual. *Higgins'* respectable expense report utility is unique in the roundup. You can attach expense items to any log item, search items, and print out reports.

Higgins offers ample external links, provided you invest $1595 in *Higgins Exchange.* This program links two *Higgins* LANs and lets you use extra-cost options for remote access, faxes, and gateways to other services.

Despite its rich mix of features, *Higgins'* cumbersome interface hinders operation, and the group scheduler is rudimentary. Version 2.3, which should be ready by the time you read this, promises a vastly improved scheduler.

Office Works 1.1

Office Works delivers capable E-mail and group scheduling along with an address data base and document indexing. And at $495 for six users and $1395 for unlimited access, it's a bargain. However, *Office Works* lacks advanced features such as to-do lists, connectivity, and personal utilities. Most LAN users will want more.

The *1-2-3*–like interface is perfect for novices, offering intuitive pulldown menus and dialog boxes. The documentation is tops, and an on-line tutorial and contextual help further aid new users. However, *Office Works* lacks built-in hot keys, and because it was written as a run-time application using Data Access's *DataFlex* data manager, it feels sluggish.

Messaging is solid, with extras like priority and confidentiality classifications. Yet, the only outside link is a send-only fax and telex feature. Like *Higgins*, *Office Works* lacks message folders, but it lets you index messages and files and store them locally or publicly on the server. However, its document control is not as sophisticated as *Higgins'*—to index formatted files you have to reenter basic DOS information instead of just marking files to be archived.

Office Works' group scheduler offers the most privacy in the roundup—you can't see time blocks on other calendars. To set up a meeting, you enter a time range, and the program invisibly selects the time with the fewest conflicts. As with *WordPerfect Office*, invitations are posted and calendars updated automatically, and the originator receives a reply.

As you dig in, however, you feel the lack of depth. Unlike with *WordPerfect Office*, you

EXECUTIVE SUMMARY

Office Works 1.1

Groupware package

An inexpensive starter package designed for novices, Office Works offers solid E-mail, scheduling, and document retrieval features. However, it lacks to-do lists and connectivity options, and it's relatively slow.

	POOR	FAIR	GOOD	EXCELLENT
Messaging and editing			●	
Message management			●	
Connectivity	●			
Calendaring		●		
Group scheduling			●	
Productivity utilities		●		
Overall value			●	

Reader service no. 662

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can't schedule resources or attach messages to schedules, and the masking of time blocks makes it harder to schedule optimum times. In addition, the calendar is the weakest in the roundup. The address data base is respectable, offering good search features, and you can exchange files with *DataFlex*. Unlike with *Higgins*, however, you can't attach files to entries.

The low-cost *Office Works* delivers an ultra-private scheduler in an easy package, making it a good choice for bargain hunters and novices. Yet its slow performance and lack of advanced features limit its appeal.

Growing Into Groupware

Any of these programs could prove a good buy, depending on your needs, but none covers the bases well enough to garner a Best Buy. *WordPerfect Office* takes first place by delivering the best mix of E-mail and scheduling plus a bounty of productivity aids. Although expensive, it's a dream for *WordPerfect* LANs and recommended for any work group that doesn't need links to the outside world. *The Coordinator II* takes second place, offering top E-mail skills and a novel approach to work-group integration. However, if you don't have the patience to adopt a new organizational model, look elsewhere. *Higgins* comes in third—although loaded with features, it suffers from a weak group scheduler and an awkward interface. The inexpensive *Office Works* is a good choice for novices, but it lacks sophistication.

The rise of groupware puts pressure on dedicated E-mail packages such as *cc:Mail* to offer more productivity aids. If these groupware packages boost their E-mail skills a notch, they may dominate the LANs of tomorrow. ●

Paul Christiansen is a principal in Vortex Data Systems, a San Diego–based firm specializing in high-end networks. Steve King is a program analyst for a state agency and moonlights as a computer consultant and writer. He co-wrote The DataFlex Developer's Handbook *(WordWare Publishing, Plano, Texas, 1987). Mark Munger is also a principal in Vortex. All three wrote the* NetWare Administrator's Handbook, *to be released in September by Tab Books' Windcrest label (Blue Ridge Summit, Pennsylvania).*

WHERE TO BUY

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LIST PRICE: 10 users $995, 30 users $1995, 50 users $2995; standalone version with remote access $495; ALCOM fax gateway (includes fax board) $995; MCI Mail gateway for 5 users $595; gateways to IBM PROFS and DISOSS, DEC's ALL-IN-1 and VMSmail, Wang Office, HP-DESK, and CompuServe's Infoplex extra cost via Softswitch/SNADS
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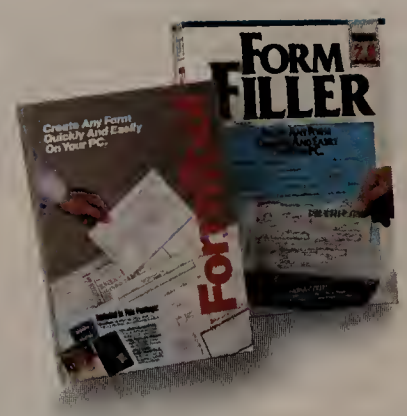

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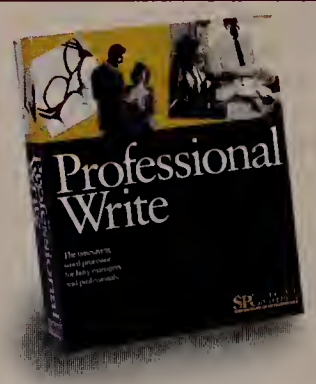

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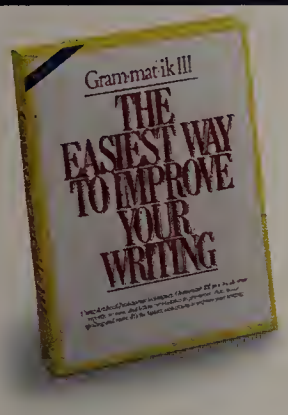

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5151 New HiREZ Mouse *(C9)* . . . . . 89.
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5051 VGA Adapter *(9AV610)* . . . . . 259.
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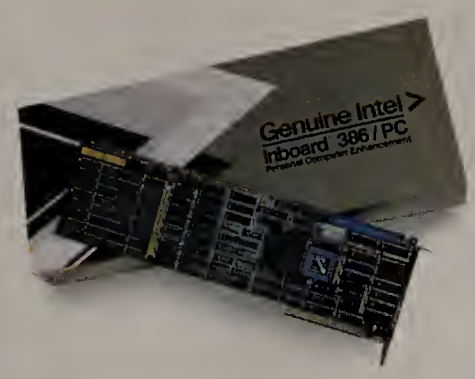

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Mouse Systems ... lifetime

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Pacific Rim ... 1 year

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3210 Breakthrough 286-12 *(12 MHz accelerator)* . . . . . 429.

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3097 Microbuffer Inline *(par. print buffer/32k)* . . . . . 135.
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3102 2400 Baud External Modem . . . . . 179.
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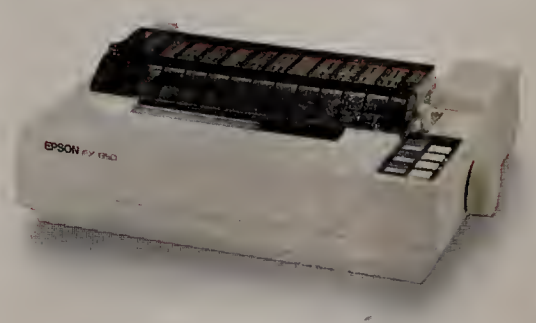

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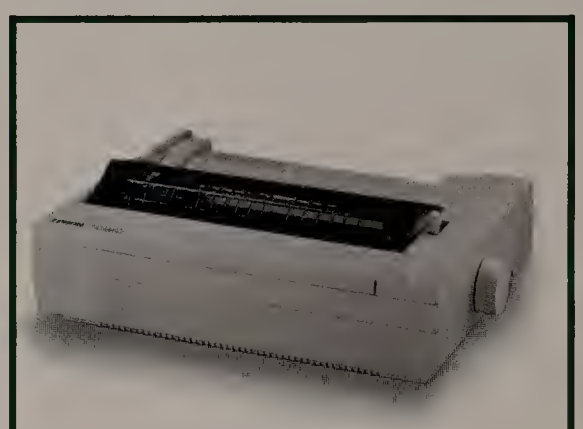

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2789	Maxell MD2-D *(10 disks per box)*	13.
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2212	Fuji MD2HD *(10 disks per box)*	22.
3770	Verbatim Datalife *(10 disks per box)*	22.
3292	Sony *(10 disks per box)*	23.
2790	Maxell MD2-HD *(10 disks per box)*	23.

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3297	Sony *(10 disks per box)*	16.
2214	Fuji *(10 disks per box)*	17.
3772	Verbatim *(10 disks per box)*	17.
2792	Maxell *(10 disks per box)*	17.

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Well-Rounded Drawing

Need a new corporate logo, a diagram of your newest widget, or a sophisticated brochure? The latest draw programs offer artists and nonartists alike the best tools for the job.

Steve Roth

Graphics created on the PC look jaggy and crude, right? That's certainly been the perception, and for good reason. The bit-mapped paint programs on the market just don't deliver the control, flexibility, and high resolution that business users, designers, illustrators, and desktop publishers demand.

But the object-based draw programs reviewed here—*Adobe Illustrator, Arts & Letters Graphics Editor, Corel Draw, Micrografx Designer,* and *GEM Artline*—make it easy for nonartists to create professional-looking flowcharts and diagrams annotated with sharp text. Combined with a little artistic talent, the programs work wonders for technical illustration, graphic design—even fine art.

Drawing Versus Painting

Paint programs, unlike their draw cousins, treat images as a collection of pixels. Draw a black square in a paint program, and you're really just turning on a bunch of dots. If you draw a red square on top of the black one, you eliminate the black square. You can't select it, change its color, or move it in front of the red square because it no longer exists.

Worse, the quality of the printed image depends on the resolution of the painted bit map. Print a 300-dot-per-inch (dpi) bit map on a 1270-dpi Linotronic and it looks the same—jaggies and all. Stretch or expand a bit-mapped image, and the pixels that define curved and angled lines grow as well, resulting in enlarged jagged edges.

By contrast, draw programs work with resolution-independent objects—circles, squares, blocks of type, flow-chart symbols, complex curved shapes—defined by mathematical equations. Because the objects aren't composed of pixels, they print at whatever resolution your output device produces. You can move the objects around, lay them on top of each other, break them apart, and align, rotate, skew, and flip them. You can change the thickness and color of object outlines, and fill objects with colors, shades of gray, and patterns.

New Tools, New Horizons

Until recently, creating and manipulating curves was either impossible or not worth the frustration. But new programs provide a variety of amazing tools for working with Bezier curves. Complex shapes composed of Bezier curves, as opposed to simpler spline curves or vectors, are easier to create and modify. All five programs reviewed here let you control a Bezier shape using knitting-

needle-like handles attached to points on the curve called control points.

The programs differ, however, in how they let you create curve-based images initially. Auto-tracing is the easiest method—you load a scanned image, clip art, or another bit-mapped image into the program, which traces it for you. If you don't have a template, or if your program, like *Arts & Letters* or *Artline*, doesn't auto-trace bit maps, the best way to draw curves from scratch is directly with a curve-creation tool. Direct curve creation is confusing at first, so all the programs except *Artline* let you use an on-screen pencil to draw a freehand line, which the program transforms into Bezier curves. Drawing freehand can be awkward, though, and you usually have to spend a lot of time adjusting the resulting curve.

Other Essential Tools

A draw program should also make it easy to create geometric shapes like squares, circles, and polygons. *Designer* is tops in this area, offering tools for drawing pie charts, arcs, and rounded-corner rectangles. *Arts & Letters* makes things difficult, requiring you to load even squares and circles from a symbol library.

All of the reviewed programs contain libraries of simple shapes and symbols. These collections are more useful than the complete illustrations you often find in clip art packages because you can easily edit basic shapes and group them together.

Another feature to look for in a draw program is type handling—the ability to create and manipulate text in a variety of typefaces, styles, and sizes, and to adjust line spacing, letterspacing, and kerning. *Corel*

Illustration created and color separated in Micrografx Designer 2.0 and produced on a Linotronic 300.

GORDON STUDER

FEATURES EVALUATION

PC Draw Programs: Macintosh Beware

Corel Draw and Designer consistently offer more than the competition, but no one program does it all.

● Yes
○ No
◒ Deficient

	Artline 1.0	Arts & Letters	Corel Draw 1.0	Designer 2.0	Illustrator 1.0
General					
On-line help	○	●	○	●	○
Customize menus/toolbox	○	○	○	●	○
Measurements in picas	○	●	●	◒[1]	●
Measurements in points	●	○	●	◒[1]	●
Measurements in inches and cm.	●	●	●	●	○
Calor display	●	●	●	●	○
Open multiple files	○	◒[2]	◒[2]	●	●
Object creation tools					
Circle/oval/square/rectangle	●	◒[3]	●	●	●
Pie chart	○	○	○	●	○
Circle segments	○	○	○	●	○
Rounded-corner rectangles	○	○	○	●	○
Arcs	○	○	○	●	○
Polylines	●	●	●	●	●
Spline curves	○	○	○	●	○
Bezier curves	●	○	○	◒[4]	●
Freehand curves	○	●	●	●	●
Auto-trace bit maps	○	○	●	●	●
Object manipulation					
Use Windows clipboard	n/a	●	○	●	◒[5]
Resize bit maps	●	●	●	●	○
Skew	●	●	●	○	●
Flip	●	●	●	●	●
Use objects as masks	○	○	●	○	○
Multiple selection by attributes	○	○	○	●	○
Image management system	●	●	n/a	●	n/a
Curve control					
Add curve points	○	●	●	●	●
Remove curve points	○	●	●	●	◒
Smooth/unsmaath	○	●	●	●	○
Reshape combined curves	●	●	●	○	●
Line and fill control					
Gray percentage spec'ing	●	●	●	●	●
CMYK percentage spec'ing	○	○	●	●	●
Pantane palette	○	○	●	◒[6]	○
Pattern fills	○	●	●[7]	●	○
Edit pattern fills	○	○	○	●	○
Graduated fills	○	○	●	●	○

[1] No picos or points in dialog boxes. Rulers con't display picos and paints simultoneously.
[2] Only by running multiple copies under Windaws.
[3] Avoiloble through symbol library.
[4] Spline curves moy be edited os Bezier curves.
[5] Cut and poste within Illustrotar anly.
[6] Pontone palette aptional.

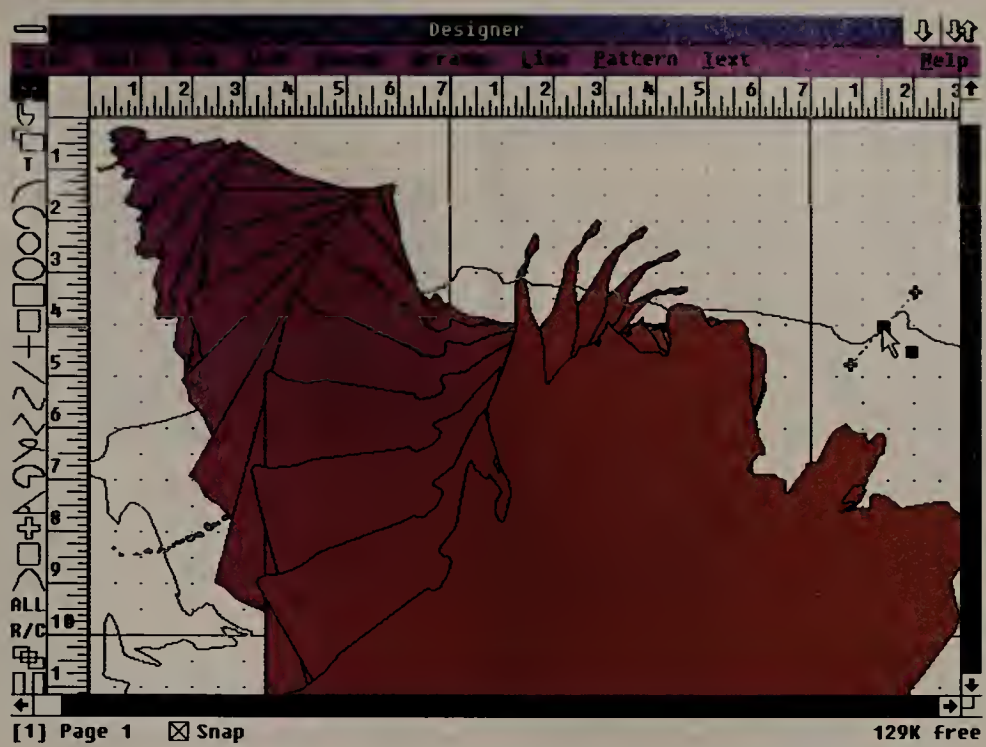
	Artline 1.0	Arts & Letters	Corel Draw 1.0	Designer 2.0	Illustrator 1.0
Object manipulation (cont'd)					
Special-effect fills	○	●	●[7]	○	○
Line pattern	○	○	●[7]	●	○
Multiple line endings	●	○	●	●	◒[8]
Multiple line styles	○	●	●	●	●
Calligraphic pen shape	○	○	●	○	○
Auto-dimensianing	○	○	○	●	○
Copy object attributes	○	●	●	○	○
Type handling					
Manual kerning	○	○	●	○	○
Automatic kerning	●	○	●	○	○
Adjust letterspacing	●	●	●	○	●
Reshape letterforms	●	●	●	○	○
Use Fontware outlines	●	○	○	○	○
Use laser printer fants	○	●	●[9]	●	●[10]
Specify fill/outline	●	●	●	○	●
Bind text ta curve	○	○	●	○	○
Import/output					
File import					
Lotus PIC	○	●	●	○	○
CGM	○	○	○	●	○
DXF	○	○	○	●	●[11]
ASCII	○	●	○	●	○
ART (Illustrator)	○	○	●	○	●
Windaws Metafile	○	○	○	●	○
PCX	●	○	●	●	●
TIFF	●	●	●	●	○
MSP	○	○	○	○	○
File export					
TIFF	○	○	●	●	○
Windows Metafile	○	●	●	●	○
CGM	○	●	○	●	○
GEM	●	○	○	○	○
DXF	○	○	○	●	○
Viewable EPS	○	●	●	●	●
Print imported bit maps	○	●	●	●	○
Color separatians	◒[12]	○	●	●	○
Crap/registration marks	○	○	●	●	○
Mirror/negative printing	○	○	●	◒[13]	○

[7] Requires PastScript printer.
[8] Curved or squore only.
[9] PostScript "Plus" set only.
[10] PastScript only.
[11] Through desk occessary canversian program.
[12] No CMYK spec'ing.
[13] Not included in first severol thousond copies shipped.

Draw leads the pack with lots of typefaces and easy, complete type controls.

No draw program is an island—desktop publishers need to import and export images on a regular basis. None of the programs are universally fluent, but *Designer* offers the most import/export choices. Another solution is to cut and paste images via the *Windows* clipboard; while all of the reviewed programs except *Artline* run under the *Windows* environment, only *Designer* and *Arts & Letters* let you cut and paste to and from other programs through the clipboard.

Separate preview and edit modes are also key features to look for. Edit mode displays outlines of objects without the fills and line styles, making it easy to manipulate the individual elements of a drawing. Preview mode shows the drawing as it will look when printed but redraws slowly after changes. *Designer* and *Artline* don't offer a preview mode (*Designer*'s layers, however, let you isolate objects, and *Artline* lets you turn off fills, for easy editing); *Arts & Letters* lets you toggle between modes. *Illustrator* and *Corel Draw* offer a two-window setup, but only *Corel Draw* automatically updates the preview window's display as you make changes in the edit window. Being able to undo the last operation performed helps—something only *Designer*, *Illustrator*, and *Corel Draw* allow.



Designer's Array feature lets you replicate objects with movement, scaling, and rotation set for each successive copy.

All five programs offer color output, but that isn't too important for most desktop folks. Grays are another story. Look for a program's ability to specify gray percentages for lines and fills. For really fancy graphics, you'll want special-effect patterns and fills and the ability to use objects as cookie-cutter-like masks.

Power and Its Price

The power these programs wield exacts a stiff hardware price. To use any of them effectively, you need an EGA or VGA display and a 286 or 386 machine. *Artline*, the fastest of the reviewed programs, is barely tolerable on an XT. *Illustrator*, the slowest, bogs down on all but the speediest 386s. And to see many of these programs' nifty graphic effects on hard copy, you'll need a PostScript printer.

Micrografx Designer 2.0

Micrografx is the old hand at PC draw programs, and their experience shows. Geared mainly toward technical illustrators and business graphics users, *Designer* offers an easy-to-use image manager and more tools for drawing geometric shapes than any of its competitors. Unfortunately, the program comes up short in the curve and type handling that artists and designers need.

EXECUTIVE SUMMARY

Micrografx Designer 2.0

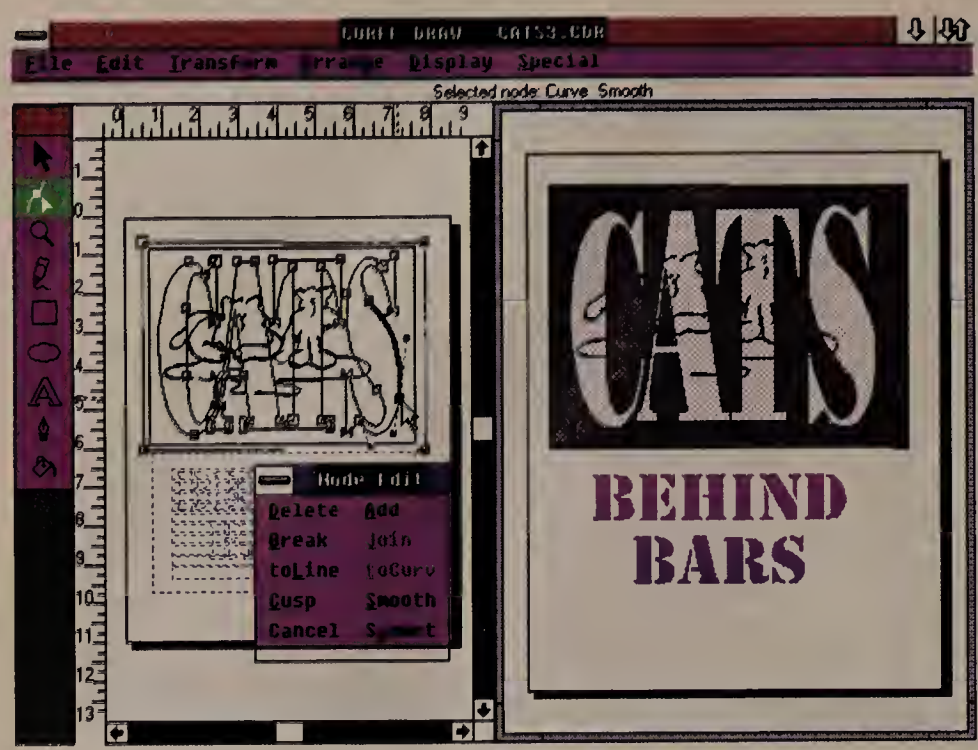
Draw program

BEST BUY

Limited type handling and curve manipulation and lack of skewing are impediments, but Designer's modifiable toolbox goes on forever. It's the best choice for technical illustrators and general business users.

	POOR	FAIR	GOOD	EXCELLENT
Object creation				●
Object manipulation			●	
Type handling		●		
Import/output			●	
Overall value			●	

Reader service no. 674



Corel Draw's special effects include graduated fills and masking—you can even use type as a mask. The program's impressive curve controls pop up when you double-click on any curve control point.

You can add or remove *Designer*'s toolbox icons for a custom interface that fits your work habits. Beyond the usual boxes and ovals, the program lets you create arcs, polylines, pie charts, and more. You can create airbrushlike graduated fills and generate color separations of images for offset printing. If you get lost, <F1> brings up comprehensive, hypertext-laced on-line help.

The program's symbol libraries come stocked with lots of useful symbols, and image management is a breeze. You can visually store and retrieve symbols—even whole drawings—by opening a library window on top of the main workspace, then cutting and pasting. You can also retrieve images using plain English identifiers like "Left-Handed Monkey Wrench."

Designer has no exclusive Bezier curve tool but offers good auto-trace and freehand tools for creating curves. However, you can't combine two curves into one and then reshape the resulting curve—a must for logo designers.

When it comes to type, you can control size and line spacing but not much else. No typeface outlines come with the program, so you can't reshape letterforms, although you can scale, mirror, and rotate them for PostScript output. You can't specify different outlines or fills for letterforms, and there's no skewing tool for adding perspective effects.

Designer has some other minor but important features: It's the only program besides *Illustrator* that displays an object—rather than an empty frame, or *bounding box*—as you move it; that automatically scrolls when a tool hits the edge of the window; and that consistently stops image redraw when you issue another command. And vector clipping, which masks hidden areas of a drawing, makes *Designer* the program for plotter users. Despite its premium price, *Designer*'s top-notch tools make it a Best Buy for technical and office illustrators.

Corel Draw 1.0

Corel Draw is the top choice for artists and designers. It offers first-rate type handling and an abundance of special effects—although many require a PostScript output device.

Type is where *Corel Draw* really shines. The program comes with 24 popular text and display typeface outlines that include bold, italic, and bold-italic variations. Unlike *Designer*, *Corel Draw* can convert any letterform into an object, reshape it, fill it with dramatic PostScript patterns, or use it as a mask. The program can also set text along a curve automatically.

Corel Draw's Bezier controls are intuitive and easily accessible—the best of the five

EXECUTIVE SUMMARY

Corel Draw 1.0
Draw program

Excellent curve manipulation tools, 24 typefaces, top-notch typographic controls, numerous special effects, and masking make this the program for flashy graphics and typography.

	POOR	FAIR	GOOD	EXCELLENT
Object creation			●	
Object manipulation				●
Type handling				●
Import/output			●	
Overall value				●

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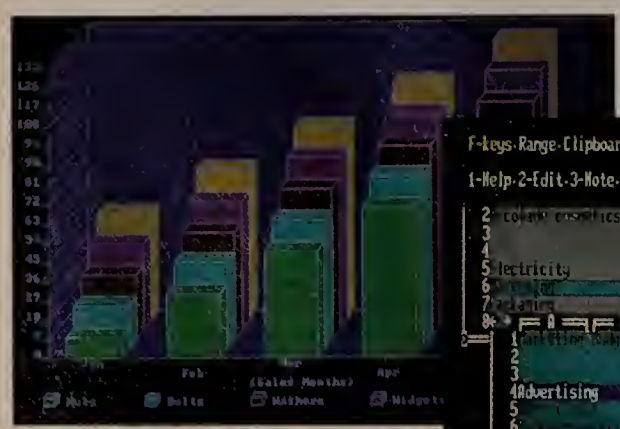

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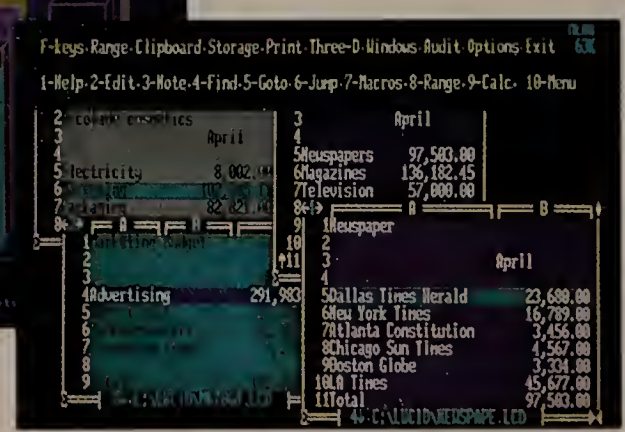

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Media Code #2(

reviewed programs'. Unfortunately, *Corel Draw* lacks a direct curve-creation tool. You're limited to auto-trace or freehand curve creation, so you'd better have a bit-mapped template or a steady hand. Also missing are tools for creating geometric shapes beyond simple ovals and boxes, and the paltry clip art consists mostly of cute interoffice memo–type images. But *Corel Draw*'s impressive ability to import .ART PostScript files means you can tap the wealth of *Illustrator* clip art on the market.

EXECUTIVE SUMMARY

Adobe Illustrator 1.0

Draw program

A basic taalbax and well-arganized keybaard/mause cammands are just right far prafessional illustratars. Curve creatian is the best araund, but *Illustrator* is taa slaw an a narmal AT and needs a PastScript printer ta ouput high-resalutian images.

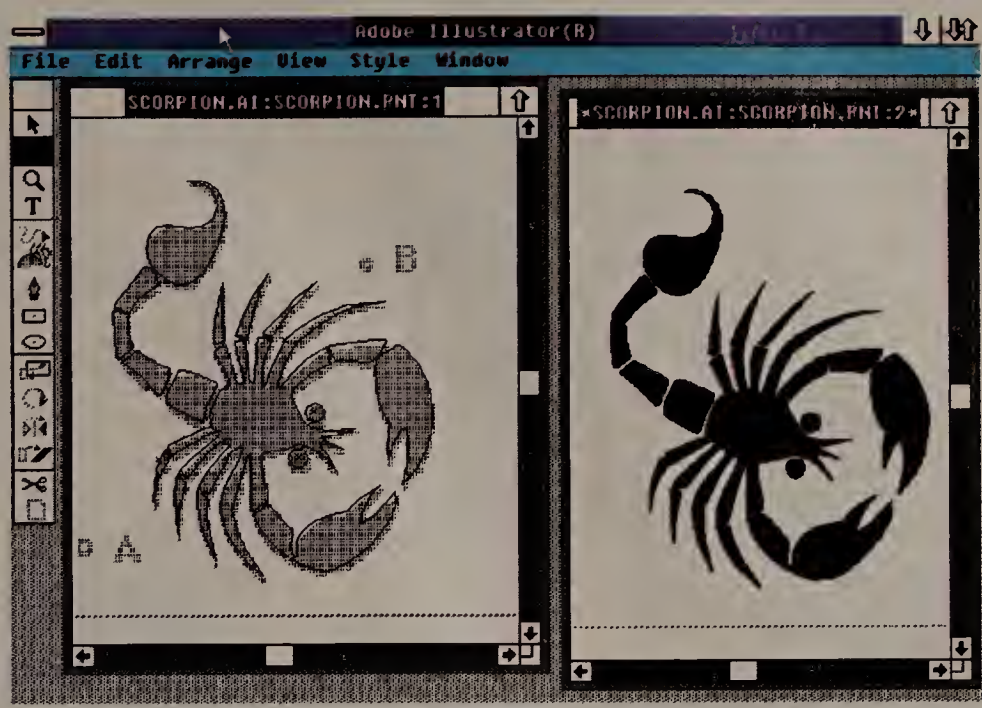
	POOR	FAIR	GOOD	EXCELLENT
Object creation			●	
Object manipulation			●	
Type handling			●	
Import/output	●			
Overall value		●		

Reader service no. 670

Adobe Illustrator 1.0

Illustrator on the Macintosh defined the category of curve-capable draw programs. However, *Illustrator* under *Windows* lacks the blending and masking tools and color display of the latest Mac version, and it looks pretty bare bones compared with *Designer* and *Corel Draw* and their abundance of tools.

Illustrator also requires some study, but once you master it, you may fall in love with the program's ingenious and well-orchestrated keyboard/mouse command combinations. Direct Bezier curve creation, a single dialog box for specifying line and fill attributes, and other subtle niceties make *Illustrator* a good choice for people who produce graphics day in and day out.



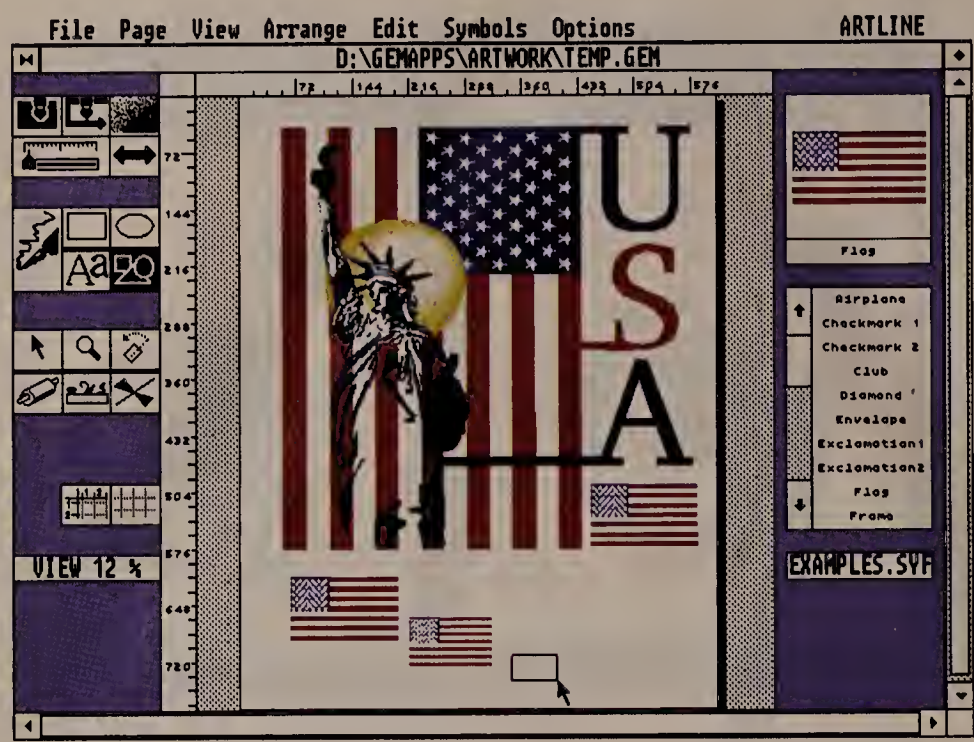
Adobe Illustrator is at its best with bit-mapped templates—for auto- or manual tracing. The separate preview mode, shown in the right window, does not update automatically.

But boosting this *slow* program to acceptable performance means investing in a 386 or fast 286 machine with plenty of expanded memory. A PostScript printer is mandatory; printing on a LaserJet delivers a near-useless screen-resolution rendition of the image. If you're undaunted by the hardware requirements, *Illustrator* leads you painlessly through installation and provides a handy guide for setting up *Windows* with expanded memory.

Aside from its sluggishness, *Illustrator* has some other nagging flaws: It can't kern text, and because *Adobe*'s typeface outlines are inextricably encrypted, you can't reshape letterforms. And *Illustrator* is the only program reviewed that can't automatically align objects. The included clip art library is small but contains useful building-block objects like arrows, borders, and boxes. Still, *Illustrator*'s pluses don't justify the steep hardware costs. *Corel Draw* is a better deal—especially if you need to manipulate lots of type.

GEM Artline 1.0

Like *Ventura Publisher*, the *GEM*-based *Artline* is proof that fast, quality graphics are possible on an XT-class machine. If you use *Ventura Publisher* with a LaserJet or another non-PostScript printer, *Artline* is the best companion draw program. Although it lacks some essential curve tools, *Artline* still merits consideration.



GEM Artline lets you cull symbols easily from libraries and change the shape of Bitstream typeface letterforms.

Artline lets you create Bezier curves directly and do most anything your heart desires with any typeface from Bitstream's *Fontware* library. The skewing tool is especially powerful and intuitive, and it's useful for distorting type.

But *Artline* can't automatically trace bit maps—a big omission if you start your drawings from scanned images or clip art. You can trace bit maps manually, but you'll need a minimum of 512K of expanded memory. Bezier handling is deficient as well. You can't create a closed shape out of curve points, for instance; the start and end points lie on top of each other, but they can't be combined for a smooth join. Nor can you add or delete points within a curve. These frustrating omissions make it hard to get shapes just right. To top it off, there's no undo command—just undelete.

Despite these failings, *Artline* is easy to use and saves files in .GEM format—*Ventura* sometimes has trouble importing other file formats, especially if they contain fills. The powerful image management system, which lets you simply drag symbols from a library window into the main window, gets an A+ in ease of use. But the supplied clip art libraries, though high quality, are too skimpy to be very useful. Still, *Artline* is the best choice for illustrations destined for *Ventura* and a LaserJet.

EXECUTIVE SUMMARY

GEM Artline 1.0

Draw program

Artline offers speed, elegant curve creation, and type and symbol handling. Despite its weak curve manipulation and lack of auto-trace, it's fast enough to run on an XT and is a good choice for *Ventura*/LaserJet users.

	POOR	FAIR	GOOD	EXCELLENT
Object creation			●	
Object manipulation		●		
Type handling				●
Import/output		●		
Overall value			●	

Reader service no. 673

EXECUTIVE SUMMARY

Arts & Letters Graphics Editor

Draw program

The clip art/symbol library makes this a good choice for the artistically uncertain. The lack of auto-trace, undo, and explicit curve creation features, however, offsets the program's good curve-manipulation tools.

	POOR	FAIR	GOOD	EXCELLENT
Object creation		●		
Object manipulation			●	
Type handling			●	
Import/output			●	
Overall value		●		

Reader service no. 671

Arts & Letters Graphics Editor

Arts & Letters' greatest strength is its large and useful library of building-block symbols. By combining symbols and rotating, resizing, and editing them, even those who are not artistically inclined can assemble complex drawings. The program's Distribute tool—similar to Mac *Illustrator*'s blend feature—is a nice touch. Otherwise, there's not much reason to buy *Arts & Letters* when you can get *Corel Draw* for $200 less.

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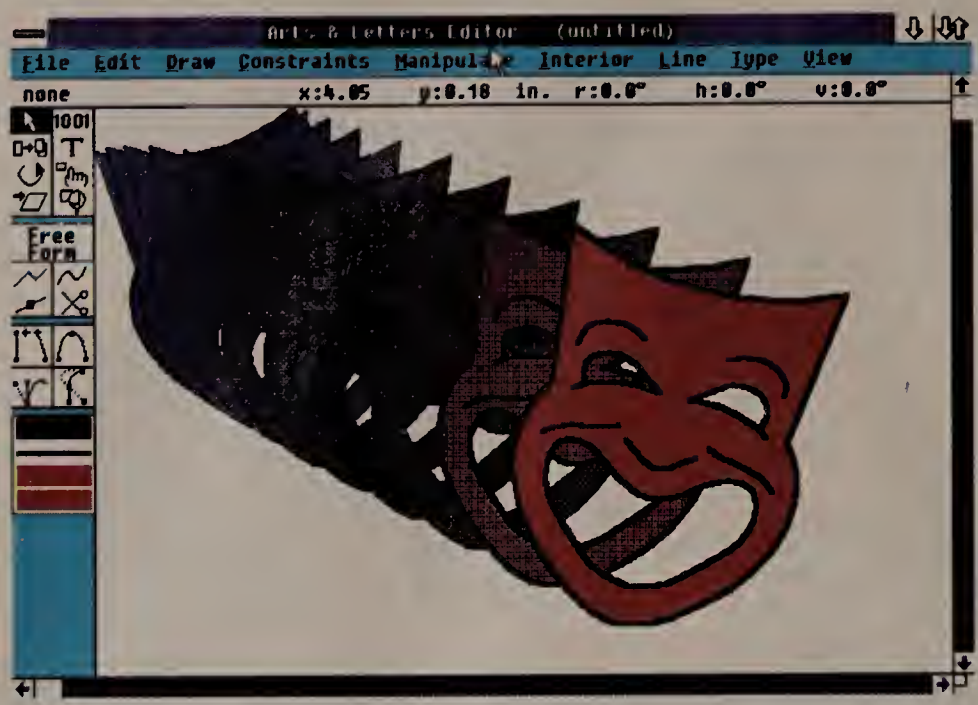

Arts & Letters' Distribute feature lets you interpolate a number of objects between an original version of an object and an edited copy.

Like other draw programs, *Arts & Letters* lets you create objects from scratch. Unfortunately, you can't create boxes or ovals using a tool. Instead, you must load them from a symbol library by number, so you constantly need to refer to the printed (but well indexed) catalog. Like *Artline, Arts & Letters* lets you undo deletions only.

Arts & Letters has no direct curve-creation or auto-tracing tools, so you need the manual dexterity required for drawing curves freehand. The program's curve controls are complete, but they're harder to use than *Corel Draw*'s.

Arts & Letters comes with 6 serif and sans serif typeface outlines, with 28 other typefaces available for $25 apiece. You can convert the letterforms to objects for reshaping, filling, and so on. But *Corel Draw* and *Artline* offer more typefaces and better typographic controls, so look to them for real pyrotechnics.

Drawing on Resources

So which program is right for you? Artists who need flashy effects and extensive curve and typographic controls should buy *Corel Draw.* If you use lots of geometric shapes and tap libraries of symbols for charts and technical illustrations, *Designer* is it. Anchored to *Ventura* and a LaserJet? *Artline* is a friendly, type-savvy companion. *Illustrator*'s complex, powerful features may attract full-time artists, but the program requires lots of hardware. Need to split hairs further? Check the accompanying Features Evaluation, then draw your own conclusions. ●

Steve Roth is a Seattle-based writer and book packager and the editor of Real World PostScript *(Addison-Wesley, Reading, Massachusetts, 1988).*

WHERE TO BUY

Adobe Illustrator 1.0
Adobe Systems, Inc.
1585 Chorleston Rd.
P.O. Box 7900
Mountain View, CA
94039-7900
415/962-2000
LIST PRICE: $695
REQUIREMENTS: 80286- or 80386-based machine with 640K conventional, 256K EMS 3.2 memory; DOS 3.1 or later version; hard disk; EGA, VGA, or Hercules display; painting device
TECHNICAL SUPPORT: unlimited, no toll-free number, M–F 8–4
OTHER SUPPORT: free newsletter, free updates far 90 days, on-line support via CompuServe
Reader service no. 670

Arts & Letters Graphics Editor
Computer Support Corp.
15926 Midway Rd.
Dallas, TX 75244
214/661-8960
LIST PRICE: $695
REQUIREMENTS: 512K, DOS 3.0 or later version, hard disk, pointing device (80286- or 80386-based machine with 640K recommended)
TECHNICAL SUPPORT: unlimited, no toll-free number, M–F 8:30–6:30
OTHER SUPPORT: math coprocessor version available free, advanced user guide and sample symbol library with registration
Reader service no. 671

Corel Draw 1.0
Corel Systems Corp.
1600 Carling Ave.
Ottawa, Ontario
Canada K1Z 8R7
613/728-8200
LIST PRICE: $495
REQUIREMENTS: 80286- or 80386-based computer with 640K; DOS 3.0 or later version; hard disk; EGA, VGA, or Hercules display; pointing device
TECHNICAL SUPPORT: unlimited, no toll-free number, M–F 8–5
OTHER SUPPORT: bulletin board
Reader service no. 672

GEM Artline 1.0
Digital Research, Inc.
Box DRI
Monterey, CA 93942
408/649-3896
LIST PRICE: $495
REQUIREMENTS: 512K, DOS 2.0 or later version, hard disk, graphic display, pointing device (640K conventional plus 512K EMS 3.2 memory recommended)
TECHNICAL SUPPORT: free for the first 90 days, no toll-free number, M–F 8:30–5
OTHER SUPPORT: extended support $95 per year
Reader service no. 673

Micrografx Designer 2.0
Micrografx, Inc.
1303 Arapaho
Richardson, TX 75081
800/272-3729,
214/234-1769
LIST PRICE: $695
REQUIREMENTS: 512K, DOS 3.0 or later version, graphics display (80286- or 80386-based computer with 640K, hard disk, and pointing device recommended)
TECHNICAL SUPPORT: free for 60 days following first tech support call, toll-free number, M–F 8–6
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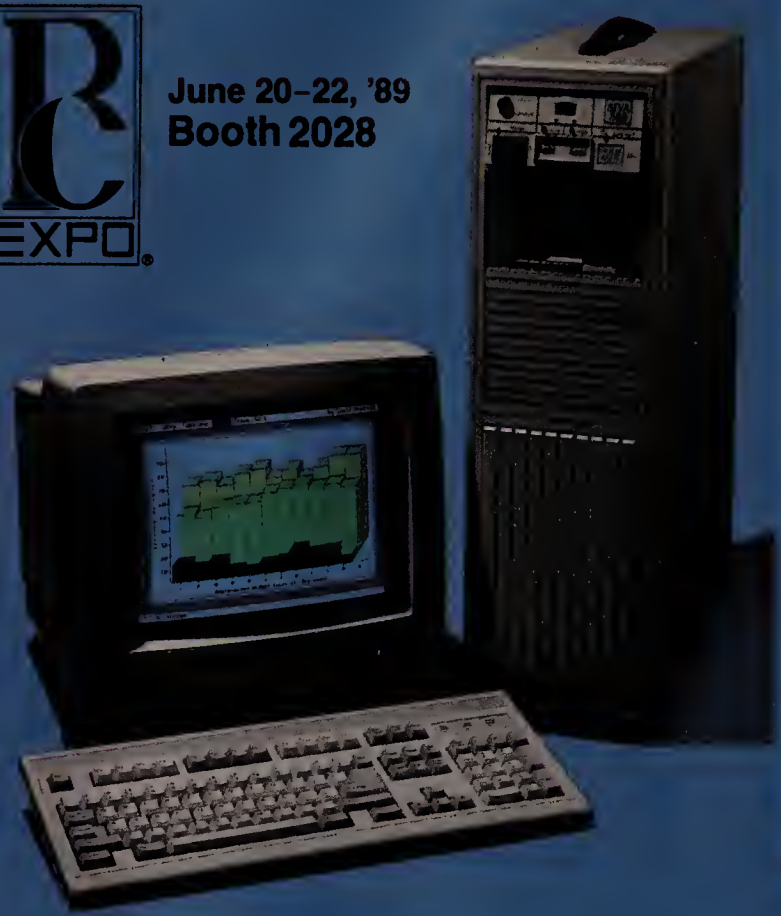

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A bevy of third-party programs offers special features to enhance or supplement your word processor. Ranging from outliners to group writing tools, they help you add style and authority to your writing.

38 Tools for Great Writing

MATT LAKE AND
WILLIAM RODARMOR

These days word processors seem to do everything but walk the dog —yet they still can't meet everyone's needs. If your spelling checker stumbles over words basic to your business, or a built-in outliner feels confining, a number of specialized third-party programs may do the job better.

This Buyers' Guide covers outliners; reference works; spelling, grammar, and style checkers; group writing tools; file converters; and document assemblers. None will turn you into a William Faulkner, but all can make your word processing faster, easier, and more accurate.

Outliners basically help you compose a document in outline form. But they can also serve as brainstorming tools to organize an argument into major and minor points. Typically, these programs let you expand and collapse subheads, make dynamic copies of heads (if you change one, the other changes as well), zoom a portion of the outline to fill the screen (called *hoisting*), and export the finished outline directly to a word processor. The best allow 32K and more of text in individual heads and let you rearrange entries by clicking and dragging with a mouse.

Under *reference works* you'll find custom dictionaries and thesauruses designed for lawyers, doctors, translators, engineers, and other specialists. The top products contain cross-references, define words and phrases, and let you explore synonyms of synonyms until you find the mot juste.

Anyone can benefit from a *spelling, grammar,* or *style checker.* Add-on spelling checkers often have a vocabulary far larger than a word processor's; some allow multiple personal dictionaries or check foreign language spellings. Other programs offer tips on punctuation, grammar, and writing style.

Especially popular among lawyers, *group writing tools* let multiple authors amend and annotate text without obliterating the original. Some use different colors or typefaces to highlight changes, display original and edited versions in a split screen, or accommodate proofreading marks.

File conversion utilities are a boon if you often have to convert documents from one word processing format to another. The best can convert files in batches.

Finally, businesses such as banks and insurance companies that generate documents with a common form but varying content may find a *document assembler* useful. Such a program lets you create a questionnaire, then automatically turns out a merged document with the answers nested amid the boilerplate. ●

OUTLINERS

Freestyle 1.5b has all the basic outliner features plus word processing, mail merge, and a glossary. Mnemonic keys call up different functions, including an on-screen tutorial. List price: $295.
Reader service no. 601

GrandView 1.01 is Symantec's high-end outliner and includes a category function that lets you cross-reference information. Besides doing the basics, *GrandView* supports a mouse, lets you use macros, opens up to nine outlines at once, and can hoist any continuous block of heads. *GrandView* accepts up to 64K for each outline entry. It also sports a word processor and a 100,000-word spelling checker. List price: $295.
Reader service no. 602

Ready is Symantec's simple, memory-resident outliner. It provides basic head and subhead shuffling and alphabetic ordering only. *Ready* features hot-key and mouse support and exports the outline in ASCII format. List price: $99.
Reader service no. 603

ThinkTank falls in the middle ground of Symantec's outlining programs. It lacks a spelling checker, can hoist only one headline at a time, and accepts only 76 characters per head. The package comes with 30 outline templates for business applications. List price: $195.
Reader service no. 604

InLine 1.01 is a low-cost stand-alone program that lets you manipulate text

ILLUSTRATIONS BY ROLLIN MCGRAIL

OUTLINERS: STRUCTURED PATHS TO ORDERLY WRITING

● Yes ○ No △ Limited only by available RAM

VENDOR Product	Auto-numbering	Amount of text per entry	Sorting	Numbering formats	Hoisting	Spelling checker	Number of windows	Zoom windows
BROWN BAG SOFTWARE PC-Outline	●	△	●	7	○	○	9	●
COMPUSENSE InLine	●	0.7K	○	4	●	○	1	○
MAXTHINK Max 89	●	△	●	5	●	○	2	●
SIMON & SCHUSTER SOFTWARE Webster's New World Outliner Plus	○	32K	●	0[1]	●	○	2	○
SUMMA TECHNOLOGIES Freestyle	●	△	●	4	●	●	1	●
SYMANTEC								
GrandView	●	64K	●	11+	●	●	9	●
Ready	○	32K	●	0[1]	○	○	1	○
ThinkTank	●	20K	●	1	●[2]	○	1	○

[1] Alphabetical order only. [2] Only one headline at a time

into a minimal outline and export it directly to one of several word processors. It provides collapsing and expanding capabilities and on-line help. List price: $49.95.

Reader service no. 605

Max 89 is a stand-alone outliner that offers sorting and hoisting and allows heads to be as long as RAM permits. But it also has a pair of unusual idea-sorting features: One lumps notes under whatever title you choose, the other sorts them in random order until a document starts to take shape. The program also automatically links multiple outlines and ASCII files and includes a utility that converts an outline into hypertext form. List price: $89.

Reader service no. 606

PC-Outline is Brown Bag Software's RAM-resident outliner. It offers a category view option to help organize information. The program can open nine windows; collapsing extraneous subheads and text limits the visual confusion. You can bypass the menu system with a comprehensive set of mnemonic commands. An upgrade will add a spelling checker and synonym finder. List price: $195, free upgrade.

Reader service no. 607

Webster's New World Outliner Plus is a simple TSR you can run alone or in memory along with a word processor, data base, or spreadsheet. It accepts 32K of text per entry but it performs alphabetical ordering only and lacks a spelling checker and zoom capability. It includes pop-up calendars, a phone log, and command summaries for DOS, *dBASE III*, *1-2-3*, and other programs. List price: $69.95.

Reader service no. 608

REFERENCE WORKS

Black's Law Dictionary, Reference Set 3.0, and **Stedman's Medical Dictionary** are memory-resident data bases that come with a core 83,000-word Random House Concise Dictionary. Professional needs are addressed by Stedman's 68,000-word medical dictionary and Black's 16,000-word legal lexicon. *Reference Set* is a 400,000-word thesaurus. Each data base can be customized with a personal glossary and can check spellings against its word list. List price: $89 each.

Reader service no. 609

Choice Words from Proximity Technology combines Webster's Concise Electronic Dictionary and Webster's Thesaurus. The 100K TSR offers pop-up definitions for 80,000 words and synonyms for 40,000, and supports most word processors and *1-2-3*. Cross-references, phrase definitions, and suggestions for incomplete words are among its key features. List price: $99.

Reader service no. 610

Concise Dictionary of 26 Languages is a RAM-resident program that defines words in 26 tongues simultaneously. The translations of 1000 common words in each language come from the full text of Lyle Stuart's 26,000-word dictionary. The vocabulary occupies 1.5MB of hard disk space. List price: $49.95.

Reader service no. 611

Funk & Wagnall's Standard Desk Dictionary contains the full 100,000-definition text of the book and a RAM-resident driver to access it. Inductel's word data base takes up slightly more than 5MB of hard disk space and provides full-screen definitions at

the stroke of a hot key. A wild-card option helps with doubtful spellings. List price: $79.95.
Reader service no. 612

McGraw-Hill Technical Dictionaries comprises six separate RAM-resident Inductel packages: *Mechanical and Design Engineering, Computers, Electrical/Electronic Engineering, Chemical Terms, Biology,* and *Physics.* Each takes up less than 3MB of hard disk space. List price: $49.95 each.
Reader service no. 613

KeyNotes AP Stylebook 1.0 provides information on punctuation, grammar, and style according to the rules of the Associated Press. The memory-resident program gives users instant access to the complete text of the AP bible and even includes a list of computer terms. List price: $59.95.
Reader service no. 614

Webster's New World Professional Thesaurus offers the full 4,000,000 synonyms of Simon & Schuster's hard copy version, including phrases, full cross-referencing, and multiple entries for words with more than one meaning. The program supports over 40 word processors, spreadsheets, and data base programs. List price: $129.95.
Reader service no. 615

Webster's New World On-Line Thesaurus II pops up the whole relevant page from the hardcover thesaurus when you highlight a word. This inexpensive thesaurus can replace words in your document, using a data base of over 1 million synonyms, and it also supports spreadsheet and data base programs. List price: $59.95.
Reader service no. 616

Word Finder 4.0 is Microlytics's 220,000-word thesaurus, but it comes with a smaller thesaurus of 120,000 synonyms for users with limited disk space. The program can replace a word in a document instantly, retaining exact punctuation and capitalization. *Word Finder* can also find synonyms for words you type in directly and confirms correct spelling. It's compatible with more than 33 word processors and is bundled with *Microsoft Word, WordStar,* and *XyWrite.* List price: $59.95.
Reader service no. 617

SPELLING, GRAMMAR, AND STYLE CHECKERS

Grammatik III offers tips for stylistic and grammatical improvements to documents from most word processors. You can run the program interactively or have it create a marked-up file or printout. After running its checks, Reference Software's program can even grade your efforts. An optional *Utilities* package lets you run *Grammatik III* as a memory-resident utility and create custom phrase and word dictionaries. List price: Grammatik III $99, Utilities $59.
Reader service no. 618

Jet:Spell Multilingual 3.23 is a stand-alone foreign language spelling checker and interactive corrector, available in 11 languages including Norwegian, Dutch, German, Spanish, and both Canadian and Parisian French. It checks abbreviations, capitalization, and compound words and can even check multiple languages in the same text. List price: with one dictionary $109.95, additional dictionaries $59.95 each.
Reader service no. 619

PC-Stylist 1.1 checks style (but not grammar) on any *WordStar* or ASCII-format document by counting sentences, words, and syllables. It produces a readability rating using that popular guide to written obfuscation, the Fog Index. List price: $29.95.
Reader service no. 620

Readability Plus analyzes a document's mix of long and short words and simple and complex sentences, then compares those ratios to statistical models of any of nine writing styles, including technical and government reports, advertising copy, and newspaper articles. Other key features grade readability and vocabulary difficulty, compare writing to a corporate style, and let you create a personal hit list of expressions to avoid. The program works with all word processors and reads *WordPerfect, Microsoft Word,* and *WordStar* files directly. List price: $94.95.
Reader service no. 621

RightWriter 3.0 checks documents in ASCII and most popular word processing formats for errors in grammar, usage, punctuation, and style. The program is designed to improve writing by pointing out cliches, wordy phrases, and passive voice. *RightWriter* produces a summary that rates the document's reading grade level, strength of delivery, and use of jargon. It also offers a list of misspelled and uncommon words. List price: $95.
Reader service no. 622

Turbo Lightning 1.0 is the original beep-as-you-type error catcher. Borland's RAM-resident program contains a spelling checker that uses the 83,000-word Random House Concise Word List and the 50,000-word Random House Thesaurus. When you type a word *Lightning* doesn't understand, the program beeps; press a key, and it produces a list of "sound-alike" words; press another key, and it implements your chosen substitution. If the beeping drives you crazy, you can turn it off and check an entire screenful of words later on. List price: $149.95.
Reader service no. 623

Webster's New World Combo combines the features of Simon & Schuster's *Professional Spelling Checker* and *Thesaurus II* from the Webster's New World group to provide 1 million synonym replacements plus spelling correction. Its spelling capacity can be upgraded by the user and by the *Professional Speller Dictionaries*. List price: $89.95.
Reader service no. 624

Webster's New World Professional Speller Dictionaries comprises three specialized word lists: *Legal*, *Medical*, and *Scientific*. These lists serve as add-on vocabularies for use with the *Combo* and *Professional Spelling Checker*. List price: $69.95 each.
Reader service no. 625

Webster's New World Professional Spelling Checker checks the spelling of single words, blocks of text, whole documents, or words as you type them. It allows users to enlarge the 114,000-word vocabulary to include auxiliary dictionaries up to 64K in size, and it supports the New World collection of add-on professional word lists. List price: $59.95.
Reader service no. 626

Whoops 3.2P compares spelling against a 50,000-word proprietary word list as you type and offers a thesaurus based on the same list. Given 190K of free RAM, you can keep the word list in memory to accelerate performance. You can also enlarge it with a personal glossary. List price: $49.95.
Reader service no. 627

Windows Spell 3.0 corrects spelling in most *Windows* applications—including *Excel*, *WinText*, *Windows Write*, *Windows Draw*, *Microsoft Word*, and Aldus *PageMaker* files, even if they contain graphics. Drawing on a 130,000-word dictionary and your personal user dictionaries, *Windows Spell* checks single words, documents in background windows, even text blocks in the Clipboard. When checking in the background, the program flashes its dictionary icon as it locates errors. List price: $95.
Reader service no. 628

GROUP WRITING TOOLS

CompareRite 3.0 compares two versions of a document and produces a third that shows added, moved, and deleted text in a variety of user-selected formats. You can also print the file with a word processor. New features in version 3.0 include options to skip passages of text and compare footnotes. List price: $129.95 plus shipping.
Reader service no. 629

DocuLiner 2.14L uses changes in color or typeface to show draft changes on screen and can print marked-up files directly with a full summary. The split-screen comparison displays windows of both drafts with the differences highlighted. The Novell and 3Com network versions support five users each. List price: $149, network version $695.
Reader service no. 630

ForComment 1.16 lets up to 15 reviewers add comments to a file while allowing only the author or editor to alter it. Comments are initialed and date stamped, creating an "edit trail." Brøderbund's program can retain 26 versions of a document and 15 comments on a given line of text. List price: $295, network version $995.
Reader service no. 631

Red Pencil 1.21 enables users to proofread and mark text for eight common operations: move, delete, insert, change, paragraph, no paragraph, stet, and query. Keyboard commands are standard, but mouse support makes marking text easier. List price: $199.
Reader service no. 632

FILE CONVERSION UTILITIES

Software Bridge 3.11 converts file formatting, including footnotes and font changes, between 19 word processors, including all versions of *WordStar*, *WordPerfect*, *MultiMate*, and *Microsoft Word*. List price: $149, network version $295, additional nodes $69 each.
Reader service no. 633

Word For Word Professional 4.1 automates two-way file conversions between 20 file formats, including *WordPerfect*, *WordStar*, *Microsoft Word*, and *Lotus Manuscript*. Users can convert single documents or batch-convert up to 200 files in one session. List price: $149, upgrade $29.95; network version for three users $299, five users $399, ten users $599.
Reader service no. 634

Word Transformer 4.01 converts files into ASCII format annotated with typesetting codes. It supports 18 high-end word processors including *Microsoft Word*, *XyWrite*, *WordPerfect*, and *WordStar*. List price: $89.
Reader service no. 635

DOCUMENT ASSEMBLERS

Blankity Blank 2.6 combines with your word processor to collect information and produce multiple documents—or preprinted forms—without repetitive typing. Users fill in questionnaires of up to 1000 questions, and *Blankity Blank* creates a merged document from the responses. It features recalculation based on numerical input, averaging, and rounding up or down. List price: $99.50, four-user version $249.50, two-user add-ons $99.50 each.
Reader service no. 636

Matt Lake is PC World's *Andrew Fluegelman intern. William Rodarmor is an assistant editor for* PC World. ●

WHERE TO BUY

OUTLINERS

Freestyle 1.5b
Summa Technologies
MacDaniel Rd.
Shady, NY 12479
914/679-5951,
914/679-9908 (fax)

GrandView 1.01, Ready, ThinkTank
Symantec Corp.
10201 Tarre Ave.
Cupertina, CA 95014
408/253-9600,
415/940-1589 (fax)

inLine 1.01
Campusense, Inc.
54 Constitutian Dr.
Bedford, NH 03102
603/472-2088,
603/472-3935 (fax)

Max 89
MaxThink
44 Rincan Rd.
Kensington, CA 94707
415/428-0104,
415/548-4686 (fax)

PC-Outline
Brawn Bag Saftware
2105 S. Bascam Ave.
#114
Campbell, CA 95008
408/559-4545,
408/559-7090 (fax)

Webster's New World Outliner Plus
Simon & Schuster Saftware
200 Old Tappan Rd.
Old Tappan, NJ 07675
800/624-0023,
800/624-0024 New Jersey, 212/373-8882,
212/373-8292 (fax)

REFERENCE WORKS

Black's Law Dictionary, Reference Set 3.0, Stedman's Medical Dictionary
Reference Saftware
330 Tawnsend St. #123
San Francisca, CA 94107
800/872-9933,
415/541-0222,
415/541-0509 (fax)

Choice Words
Praximity Technalagy Inc.
3511 N.E. 22nd Ave.
Fart Lauderdale, FL 33308
800/323-0023,
305/566-3511,
305/566-2088 (fax)

Concise Dictionary of 26 Languages, Funk & Wagnall's Standard Desk Dictionary, McGraw-Hill Technical Dictionaries
Inductel Inc.
18661 McCay Ave.
Saratagа, CA 95070
408/866-8016,
408/243-1762 (fax)

KeyNotes AP Stylebook 1.0
Digital Learning Systems
Faur Century Dr.
Parsippany, NJ 07054
800/992-0264,
201/538-6640,
201/538-2426 (fax)

Webster's New World Professional Thesaurus, Webster's New World On-Line Thesaurus ii
Siman & Schuster Saftware
Scatts Valley, CA 95066
408/438-8400,
408/439-9273 (fax)

Webster's New World Combo, Webster's New World Professional Speller Dictionaries, Webster's New World Professional Spelling Checker
Siman & Schuster Saftware

Whoops 3.2P
Carnucapia Software
P.O. Bax 6111
Albany, CA 94706
415/528-7000

Windows Spell 3.0
Palantir Inc.
17314 Tamball Pkwy.
#101
Houston, TX 77064
713/955-8787,
713/955-8924 (fax)

GROUP WRITING TOOLS

CompareRite 3.0
Jurisaft, a divisian af Mead Data Central, Inc.
763 Massachusetts Ave.
Cambridge, MA 02139
617/864-6151,
617/661-0630 (fax)

DocuLiner 2.14L
Campu-Law
3520 Wesley St.
Culver City, CA 90230
800/452-9529,
213/558-3360,
213/558-4486 (fax)

ForComment 1.16
Brøderbund Saftware
17 Paul St.
San Rafael, CA 94903-2101
800/521-6263,
415/492/3200,
415/499-8661 (fax)

Red Pencil 1.21
Capsule Cadewarks
P.O. Bax 3026
Rentan, WA 98056
206/644-7281

FILE CONVERSION UTILITIES

Software Bridge 3.11
Systems Campatibility Carp.
401 N. Wabash #600
Chicaga, IL 60611
800/333-1395,
312/329-0700,
312/670-0820 (fax)

Word For Word Professional 4.1
Mastersaft
4621 N. 16th St. #B-210
Phaenix, AZ 85016
800/624-6107,
602/277-0900

Word Transformer 4.01
IMSI
1299 Faurth St.
San Rafael, CA 94901
800/222-4723,
415/454-7101,
415/454-8901 (fax)

DOCUMENT ASSEMBLERS

Blankity Blank 2.6
Saftstream Technalagies
2740 Hallywaad Blvd.
Hallywaad, FL 33020
800/888-9292,
305/920-9292,
305/920-9211 (fax)

SPELLING, GRAMMAR, AND STYLE CHECKERS

Grammatik iii
Reference Saftware

Jet:Spell Multilingual 3.23
Polyglot, Inc.
2540 Frontier Ave. #200
Baulder, CO 80301
303/449-7002,
303/449-2897 (fax)

PC-Stylist 1.1
ButtanWare
P.O. Bax 96058
Bellevue, WA 98009-4469
800/528-8866,
206/454-0479,
206/454-1838 (fax)

Readability Plus
Scandinavian PC Systems
51 Manrae St. #1101
Rackville, MD 20850
800/288-7226,
301/294-7450,
301/251-1053 (fax)

RightWriter 3.0
RightSaft Inc.
4545 Samuel St.
Sarasata, FL 34233
800/992-0244,
813/923-0233,
813/921-7849 (fax)

Turbo Lightning 1.0
Barland Int'l
1800 Green Hills Rd.

Word Finder 4.0
Micralytics, Inc.
One Tabey Village Office Park
Pittsfard, NY 14534
800/828-6293,
716/248-9150,
716/248-3868 (fax)

Second Look

Hard Disk Utilities Revisited

Hard Disks

Concerned about the health of your hard disk? Consider one of these helpful utilities.

Nancy Canning

The table that accompanied "How to Recover From Hard Disk Disaster" ("Tips & Techniques," PCW, *May 1989) incorrectly listed some of the features offered by six leading hard disk maintenance packages. Rather than simply print a correction, we're taking this opportunity to explore the products in more detail, and we've added complete vendor contact information.* PC World *regrets the errors, and we hope you find the additional information useful.*

When a cranky hard disk suddenly puts vital data out of reach, even the most technically indifferent PC user can learn to love a hard disk utility package. Complete novices will find *The Norton Utilities Advanced* and *Mace Gold* particularly good teachers and *PC-Tools Deluxe* very helpful. *Disk Technician Advanced*, *HTest/HFormat*, and *SpinRite* offer bonus features for the more technically astute user.

Disk Technician Advanced 3.0

The more often you monitor your drive's performance with *Disk Technician Advanced*, the smarter this package gets—and the better off you'll be. *Disk Technician Advanced* builds a data base containing a record of each error, then warns of impending trouble with your disk drive or controller. A set of test and repair utilities can also ward off breakdowns.

HTest/HFormat 2.0

For people who need help fast, *HTest/HFormat*'s detailed instructions help you recover data from most disasters. The package provides utilities to save your Master Boot Record (MBR), to replace deteriorated or missing sectors, and to compare different versions of files. It also offers an interleave optimizer, surface and transfer tests, and nondestructive formatting.

Mace Gold

Mace Gold is a full-featured hard disk companion for preventive maintenance, fault analysis, and repair—plus data backup and recovery. The package includes utilities to back up your system information (MBR, FAT, and root directory), protect against viruses, and perform a nondestructive format. *Mace Gold* also offers diagnostic tools, a sector editor, and utilities to undelete and unfragment files, as well as unformat disks.

The Norton Utilities Advanced 4.5

Though best known for its ability to recover deleted files, Peter Norton's package also analyzes disks and recovers data lost because of drive or file deteriora-

tion. The Norton Disk Doctor automatically diagnoses and cures most problems that afflict hard and floppy disks. The package also delivers system and disk information, sorting routines, a batch file generator, and text- and file-search utilities. The accessible documentation is complemented by dialog boxes and help screens.

PC-Tools Deluxe 5
In addition to a full assortment of menu-driven, extended DOS utilities, *PC-Tools* lets users perform nondestructive formats, unfragment files, optimize a hard disk, and use the disk map and sector editor to recover from accidental deletions or formatting. The package can also save a copy of your system information and restore it easily when needed.

SpinRite 1.2
SpinRite's prime function is to test your hard disk periodically and warn of problems that can arise as your formatting information deteriorates. The package can analyze drive/controller performance and optimize the interleave, as well as repair many kinds of low-level format damage. Although designed for all users, *SpinRite* is particularly useful for technicians who need to perform in-depth tests when troubleshooting or configuring disks and their controllers. ●

Nancy Canning, a consultant and writer, is a former technical manager for PCW Communications.

Two Kinds of Hard Disk Utilities

Whether an all-around utility like Mace Gold or a hard disk specialist like SpinRite, these programs are invaluable when trouble strikes your system's disk.

Functions	Disk Technician Advanced 3.0	HTest/HFormat 2.0	Mace Gold	Norton Utilities Advanced 4.5	PC Tools Deluxe 5	SpinRite 1.2
Nondestructive sector-level test	✓	✓	✓	✓	✓	✓
Destructive sector-level test	✓	✓				
Seek and transfer test	✓	✓		✓		✓
Tests disk controller	✓	✓				✓
Allows manual designation of bad sectors	✓	✓	✓	✓	✓	
Sector analysis and editor		✓	✓	✓	✓	
Optimizes interleave	✓	✓				✓
Unfragments files			✓	✓	✓	
Optimizes disk			✓	✓	✓	
Removes deleted-file information from DIR			✓	✓	✓	
Nondestructive format	✓	✓	✓	✓	✓	✓
Saves system information for format recovery		✓	✓	✓	✓	
Unerases files and subdirectories			✓	✓	✓	
Unformats			✓	✓	✓	
Unremoves directories			✓	✓	✓	
Prints reports to file or printer	✓		✓	✓	✓	✓
Produces visual disk map			✓	✓	✓	✓
Parks heads	✓	✓	✓		✓	✓
Recovers files automatically	✓		✓	✓	✓	
Backup program			✓		✓	

WHERE TO BUY

Disk Technician Advanced 3.0
Prime Solutions
1940 Garnet Ave.
Son Diega, CA 92109
619/274-5000, 619/272-4000 (tech support), 619/272-4008 (fox)
LIST PRICE: $189
Reader service no. 750

HTest/HFormat 2.0
Mace Gold
Paul Moce Saftware
400 Williamson Way
Ashland, OR 97520
800/523-0258, 503/488-2322, 503/488-0224 (tech support), 503/488-1549 (fox)
LIST PRICE: HTest/HFormat $89.95; Mace Gold $149
Reader service no. 751

The Norton Utilities Advanced 4.5
Peter Norton Computing, Inc.
100 Wilshire Blvd., 9th floor
Sonta Monica, CA 90401
800/365-1010, 213/319-2000, 213/391-2020 (tech support), 213/458-2048 (fax)
LIST PRICE: $150, upgrade $39
Reader service no. 752

PC-Tools Deluxe 5
Centrol Paint Saftwore, Inc.
15220 N.W. Greenbrier Pkwy. #200
Beaverton, OR 97006
503/690-8090, 503/690-8083 (fax)
LIST PRICE: $79
Reader service no. 753

SpinRite 1.2
Gibsan Research Carp.
22991 La Cadena
Laguna Hills, CA 92653
714/830-2200, 714/830-2500 (tech support), 714/830-0300 (fax), 714/830-3300 (BBS)
LIST PRICE: $59
Reader service no. 754

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101 Key Keyboard
MS DOS 3.3 or 4.01

$2295.00

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1.2 Meg 5¼" Drive
1.44 Meg 3.5" Drive
40 Meg 28ms Drive
16 Bit VGA Board
14" VGA COLOR Monitor
1 Parallel/2 Serial Ports
101 Key Keyboard
MS DOS 3.3 or 4.01

$2395.00

20 Mhz 286 VGA

80286-20 Processor
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1.2 Meg 5¼" Drive
1.44 Meg 3.5" Drive
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16 Bit VGA Board
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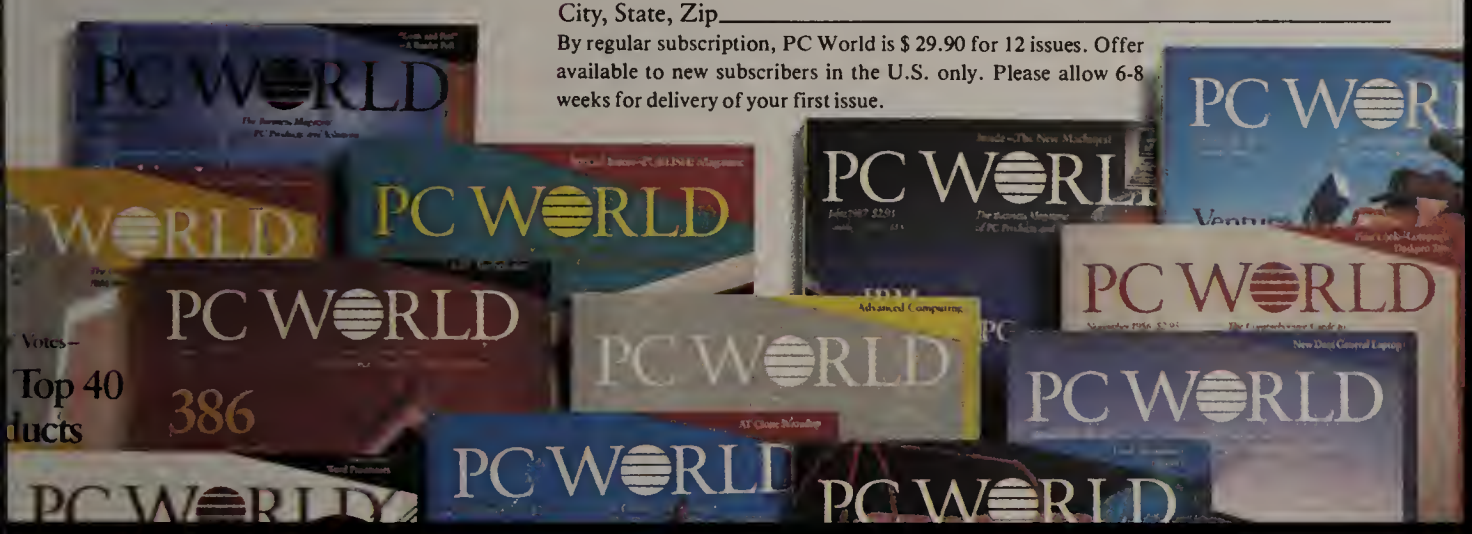

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20 Mhz 386 VGA

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1.2 Meg 5¼" Drive
1.44 Meg 3.5" Drive
80 Meg 28ms Drive
16 Bit VGA Board
14" VGA COLOR Monitor
1 Parallel 2 Serial Ports
101 Key Keyboard
MS DOS 3.3 or 4.01

$2995.00
(Upgrade to 4 Megs $500)

25 Mhz 386 VGA

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14" VGA COLOR Monitor
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101 Key Keyboard
MS DOS 3.3 or 4.01

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64K Cache RAM
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16 Bit VGA Board
14" VGA COLOR Monitor
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101 Key Keyboard
MS DOS 3.3 or 4.01

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GATEWAY 2000

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Circle 227 on reader service card

"How did I find out about the number one selling 286 laptop? My competition was killing me with it."

ZENITH INNOVATES AGAIN™

Today's leading 286 battery-powered portable* gives you the edge you need to be number one on the road.

Turning miles into dollars. That's business as usual with SupersPort 286.™ Another Zenith Data Systems innovation to let you work the way you want... *where* you want.

With the lightweight SupersPort 286, hard-driving AT desktop performance is yours. Anywhere your business takes you. To crunch the numbers. And the competition.

And we mean *crunch.* SupersPort 286 is loaded with unrelenting speed and power to tackle huge spreadsheets, files and databases. It even lets you extend your productivity through Zenith's *Intelligent Power Management System,*™ which puts power usage in *your* control. For more than four hours of non-stop battery life.

SupersPort 286 also features a dazzling backlit *Supertwist* LCD screen for superior readability. It also has one of the widest viewing angles of any portable, and can be used in virtually all lighting conditions.

So put Zenith Data Systems' SupersPort 286 in the driver's seat. And start letting your competition know who's number one on the road.

For the name of your nearest Zenith Data Systems authorized dealer, call *1-800-842-9000, ext. 1.*

Graphics simulate Microsoft® *Windows*, a product of Microsoft Corporation. Microsoft® *Windows* is included with all hard disk models of Zenith Data Systems' advanced desktop systems.

*Source: Dataquest

ZENITH | data systems

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CONSUMER WATCH

Advice and information for the computer consumer

This month: Readers speak out about mail-order delays, strict return policies, and nagging repair problems—and report a few happy endings, too.

Anita Amirrezvani

SHOP TALK

The New PC Network's New Look

Until recently, The New PC Network, a mail-order company in the Chicago area, ran ads listing products at surprisingly low prices. Each price was marked with an asterisk; the inquisitive shopper had to hunt down the corresponding asterisk at the bottom of the page to learn that the real cost was 8 percent more than the advertised "wholesale" price. After adding shipping charges and credit card surcharges—often called "discounts for cash"—the total cost could be 11 percent more than what was listed in the ad.

Jeffrey Kleckner, president of The New PC Network, says the company has clarified its ads. "We've changed our program because many customers were confused," he says. "Our advertised prices are now our selling prices, except for freight charges." And Kleckner says there are no surcharges for credit cards, either.

Fast Micro Alert

In the last six months, *Consumer Watch* has received nine complaints about Fast Micro, a mail-order company in Phoenix. Most of the complaints concern delays in shipment, checks cashed and credit cards billed long before merchandise is shipped, poor response to problems, and an unanswered or continuously busy customer service number. Two readers reported that they called 20 times or more before getting through.

Fast Micro has generally been responsive to *Consumer Watch* requests for refunds or other action. In two cases, however, the company declined to provide refunds. Mail-order shoppers should be aware of the following Fast Micro policy, as stated in a recent letter to *Consumer Watch:* "We do not take opened items back under any conditions. It is totally up to the buyer to determine that the product they are about to order meets his/her requirements. We accept a return only on unopened products with a 15 percent restocking fee."

Although Fast Micro's current ad reads, "No returns on *used* items," we think this phrasing could easily be interpreted to mean something different than *unopened* items.

Exceptional Care?

In June 1988 I purchased a Toshiba T1200 for two reasons: My previous unit, a Toshiba T1100 Plus, was a highly reliable portable; and the Exceptional Care service agreement promised a one-day turnaround on repairs. The agreement further promised that if the computer could not be repaired in the stated time period, a replacement would be provided.

To my chagrin, the T1200 has never been completely functional, and Toshiba has not lived up to the terms of the Exceptional Care agreement. In November 1988, I sent my computer to Toshiba for repairs for the third time. I feel I'm being held hostage by Toshiba's service organization and its excuses.

James H. Beeson
Tulsa, Oklahoma

Toshiba America responds: As soon as this matter was brought to our attention, we responded by calling Dr. Beeson to assure him that his T1200 would be repaired. The computer was fixed and returned to him, and he as-

(continues)

ANTHONY RUSSO

It Shouldn't Take Forever to Learn Your Accounting Software

BusinessWorks PC makes it easy.

PC WORLD "BusinessWorks is a slick program that's easy to use . . . powerful features and ease of use merits ***PC World's Best Buy Award***" March 1989

SOFTWARE DIGEST "BusinessWorks is the best of the low cost accounting programs. Most users become productive using BusinessWorks within just a few days." ★★★★ ***Rating*** August 1988

PERSONAL COMPUTING "The excellent interactive guidance . .. made it the clear winner in Practicality." ***No. 1 - Overall Practicality*** January 1989

INFOWORLD "Ease of learning is rated excellent. Ease of use is judged excellent." ***Best in its Class*** October 24, 1988

ACCOUNTING MADE EASY!

BusinessWorks PC's lets you dedicate your time to managing your business, not your books. Pull-down menus, built-in context-sensitive HELP, and pop-up show windows make setup and daily use amazingly simple. Plus, when you purchase BusinessWorks PC, you'll receive 90 days of toll-free support from the experts at Manzanita Software. With BusinessWorks PC you're never alone.

AS YOUR BUSINESS EXPANDS, LET BUSINESSWORKS PC FLEX ITS MUSCLE

System Manager. General Ledger. Accounts Payable. Accounts Receivable. Payroll. Everything you need to completely manage and control your business is at your fingertips. You can even use BusinessWorks PC with other popular MS-DOS spreadsheet, word processing and desktop publishing programs. Efficiency and performance have not been compromised for ease of use.

PERFORMANCE YOU CAN COUNT ON

With 11 years of experience producing and supporting quality accounting software, the staff at Manzanita Software Systems knows what it takes. Ask yourself, can your business afford to be without BusinessWorks PC? Then call us, toll-free at Manazanita Software.

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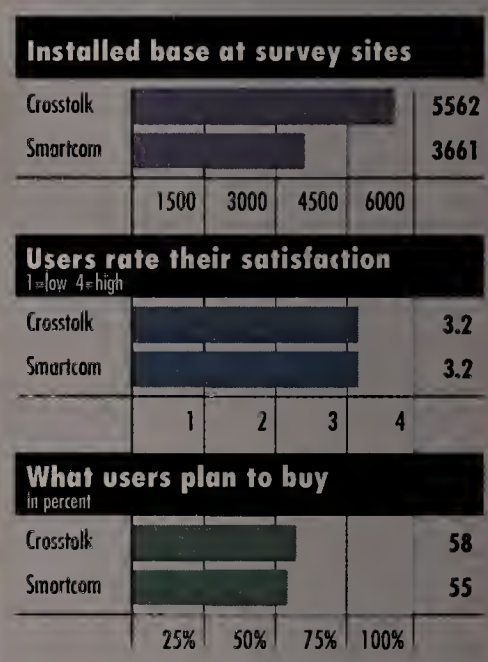
Circle 169 on reader service card

RATE YOUR SATISFACTION: Communications

The race between *Smartcom* and *Crosstalk* is about even. According to this survey of large organizations with 50 or more PCs, users are equally satisfied with both. And the majority plan to continue to buy both products.

For consumers, *Smartcom*'s advantage is that it's bundled free with some Hayes modems and generously discounted with others. DCA/Crosstalk Communications, on the other hand, offers a more varied line of products, with *Crosstalk Mk.4* at the high end and *Crosstalk XVI* for less demanding users. But dollar for dollar, both companies face stiff competition from inexpensive, competent products like *ProComm Plus*.



Source: International Data Corporation. From a survey conducted in August 1988 of 188 organizations, each with at least 50 PCs.

sured us that it was working to his satisfaction.

Our track record in the Exceptional Care program has been excellent, but we are not standing pat—we are implementing new measures to improve customer service, including a new automated telephone system, more training for customer service representatives, and increased staff.

Toshiba Product Management
Computer Systems Division

(continues)

How Farsighted Executives Are Using Their PC's For The Fun Of Profit.

By William J. Spink

For years now you've been hearing about the wonderful things personal computers will do for The Executive of the 80's—at least in theory.

But what's the *reality*? Can a PC help you enjoy your work more and show a greater profit, here and now? According to your peers, the answer is "yes."

"With just a few keystrokes," says Al Lynch, Director of Corporate Planning and Research for JCPenney Company, "I can screen companies, find possible acquisitions or 'scope-out' competitors. It's a real competitive edge."

Walt Casey, V.P. of Communications at ConAgra says, "I spend a lot of time each day poking into this and tracking that. It's *much* easier when you can immediately get the facts from a computer, rather than having to make a series of phone calls."

"One of Dow Jones News/Retrieval's services, QuickSearch, is a Godsend," adds Jim Posner, a respected retail consultant. "It gives me detailed corporate reports within minutes—I don't even have to leave the office.

Instant information: the executive advantage.

To lead in today's marketplace, you need information like *that*," Lynch says, snapping his fingers.

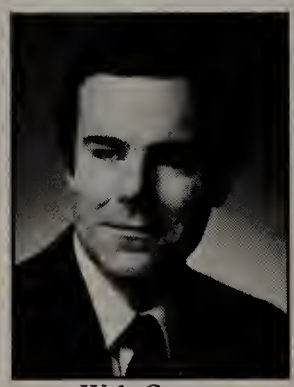
He recalls an example of how Dow Jones News/Retrieval®—the business and financial information service from Dow Jones & Company, Inc.—gave JCPenney Company a real advantage.

"Let's just say that a 'major player' in our industry was being acquired. Within a few hours we knew more about the takeover candidate than the bidder did. Honestly, we knew more than some investment bankers did.

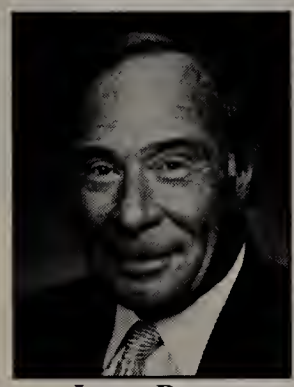
Decision-making with the leading edge.

"Then we started getting the corporate insider trading data," Lynch continues. "It showed us some things that influenced a major deal.

Al Lynch
Director of Planning and Research, JCPenney Co.



Walt Casey
Vice President, Corp. Communications, ConAgra, Inc.



James Posner
President James Posner Assoc. Ltd.

"This service really makes a difference in the day-to-day running of your business. It can pay for itself very quickly."

Surprisingly easy.

All you need to access the service is a PC and modem. Using the service is "No problem," according to Posner.

"There's no difficulty using the service. I ask for pointed, specific information and get exactly what I need. It's much easier than manual research."

Walt Casey agrees. "Dow Jones News/Retrieval is simple enough for anyone who's at all comfortable with computers to use it effectively from their very first day online."

Making the right decision.

There are hundreds of online information services, many offering business data. How can you pick the best *one*?

"It was apparent from the first step that the most useful system was Dow Jones News/Retrieval," remembers Casey. "It offers so much of the information you're looking for—from general news and stock quotes, to data on our company and industry. It was the best single source."

"I've had other services, but Dow Jones News/Retrieval has the most useful business information in the right form," says Posner. "The time I spend 'playing' on the computer makes more money for me—and for my clients."

Now that's the *fun* of profit! ■

What can you get from your PC?
Dow Jones News/Retrieval gives you...

- Exclusive online access to the full text of *The Wall Street Journal*
- Current and historical stock quotes
- Business news as it happens
- 10-K and 10-Q data
- Leading investment analysts' reports
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Over 40 services including MCI Mail,® the Official Airline Guide™ and more.

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YES, I'm ready to experience the fun of profiting from my PC. Send me a Dow Jones News/Retrieval® Business Membership Kit, including multiple passwords, 3 free* hours of online time, a year of *Dowline*™ Magazine, a comprehensive User's Guide and waiver of my first year's annual $18 service fee—for only $29.95.

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LaserJet on the Loose

We ordered an HP LaserJet from Kenco General Electronics in Maspeth, New York, in October 1988. Our check cleared the company's bank on October 24, but we have not received the printer. Each time we call, Kenco gives us the runaround. We have written twice demanding our money back, but Kenco has not responded.

Patrick R. Lyle
Wheeling, West Virginia

Kenco General Electronics responds: Because the check was not properly posted to our account, we showed no record of the payment. We therefore had to go through thousands of records manually to find the check. After we found it, we realized it was not properly posted because a purchase order had not been sent with it. In February, we shipped the order.

Neil Kaye
Co-Owner
Kenco General Electronics

A Job Well Done: Practical Peripherals

Recently I installed a serial mouse in my PC. Because my internal modem and serial printer were already occupying COM1 and COM2, I planned to switch the internal modem to COM3 and connect the mouse to another serial port. Unfortunately, my two-year-old Practical Peripherals 1200 modem could only be set for COM1 or COM2.

Rather than purchase another modem, I contacted Practical Peripherals in Westlake Village, California, and was amazed at what followed. For a mere $7.50 shipping fee, I returned the modem; in exchange, the company sent me a brand-new 1200-bps internal modem that could be set for COM3. Because the software included with the original modem did not recognize COM3, a copy of the current bundled package, *ProComm*, was also included, complete with documentation.

The company should be congratulated for maintaining customer satisfaction at what is really its own expense.

Keith Kaufman
San Francisco, California

To send correspondence or to submit material for publication in this column, please see How to Contact PC World, page 4. ●

Q.

"Where Do I Turn For More Information?"

A.

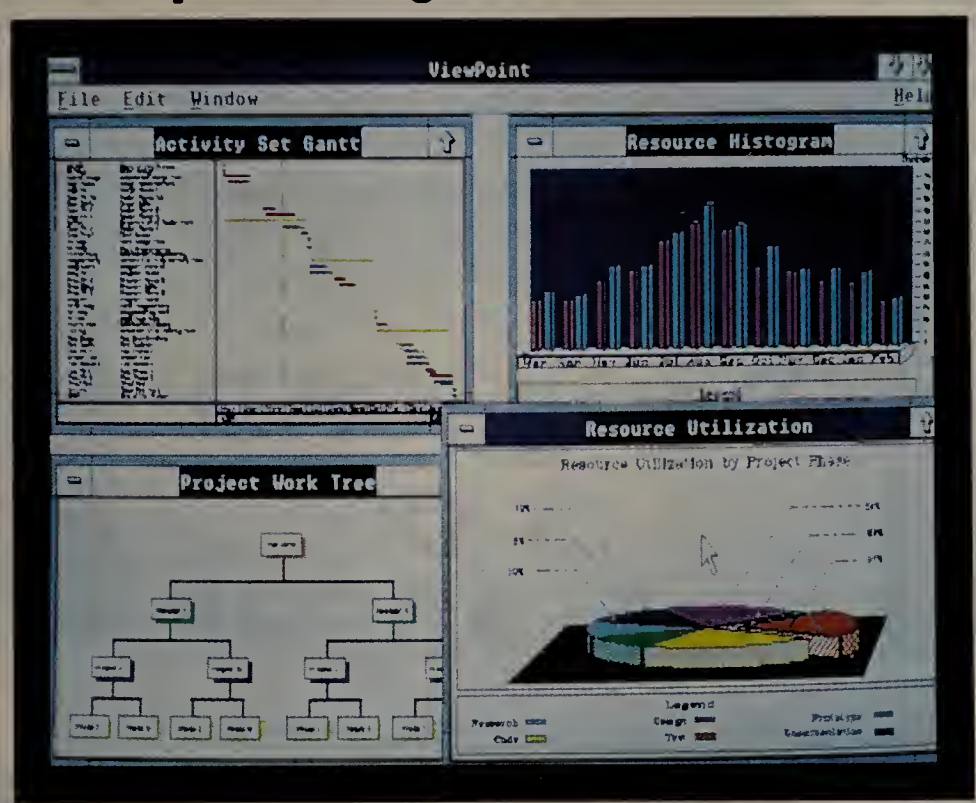
1. Turn to the Reader Service Card at the back of this issue of *PC World*.
2. Find the Reader Service number of the product you want in the product or advertiser indexes.
3. Circle the number, fill out the postage-paid card and send it in. It's that simple.

In return, our advertisers will send you more information on the products you want. It's just another way that *PC World* helps you make the best buying decisions for your company.

PC WORLD

"On Time *and* Under Budget!"

The Project Manager That Gets You There!



PC MAGAZINE Editor's Choice

ViewPoint is the acclaimed **project management** program designed to manage multiple projects, across divisional boundaries, using the same resources.

Profit from a Different Point of View

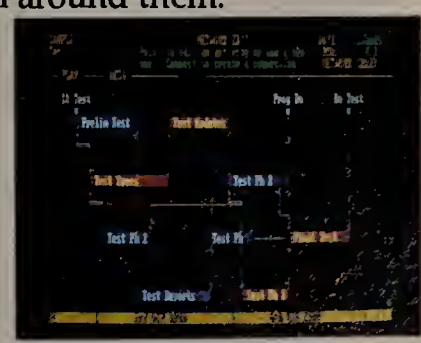
Create the necessary visibility to get management consensus *before* adding detail to the plan. **ViewPoint's mouse-driven**, point-and-click operation makes **on-screen modeling** easier. Speed up project development or defining reports with templates from **ViewPoint's library.**

Adopt ViewPoint and Trace Overloads

Interactively fine-tune projects without delaying finish dates or deliverables. **Resource Load Trace** uniquely finds solutions when conflicts arise and traditional methods like Leveling and Constraining won't work to resolve them.

ViewPoint Activities are Well Connected

Import and Export ASCII, dBASE or Lotus files and save milestone events for **auto-linking**. Display project status with presentation-quality charts on printers and plotters. **Preview everything on-screen**; or save reports to disk and use the mouse to scroll around them.



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Aw . . . What the Heck!

EXTREMELY POWERFUL

DesignCAD 3-D version 2.0 is as powerful as most CAD systems costing $5000 - $10,000! Features like: Complex Extrusions-linear, scaler, and circular, Blending of Surfaces, Shading, Cross Sectioning, Complex Sweeps and Translations, and Boolean operations make DesignCAD 3-D one of the most powerful 3-D CAD systems available . . . at any price! Engineers, Architects and Consultants constantly tell us that they use CAD systems costing thousands of dollars which are not as powerful as DesignCAD 3-D.

VERY EASY TO USE

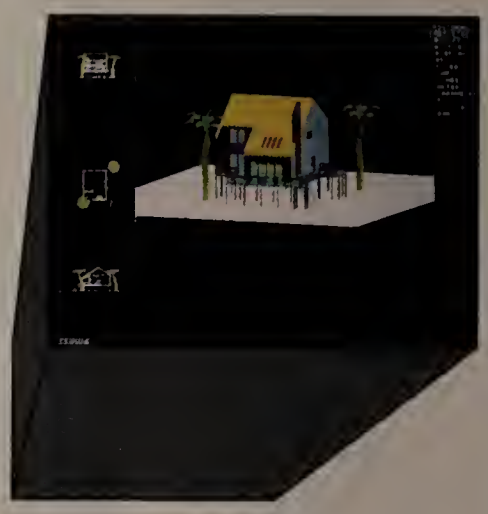
Just because DesignCAD 3-D is powerful doesn't mean it is difficult to use. Single keystroke commands and side-bar menus which give short directions on how to proceed make DesignCAD 3-D a snap to use! While not required, DesignCAD 3-D supports all popular digitizers and mice.

Many of the older, more cumbersome CAD systems require weeks of training before a user can be productive. DesignCAD 3-D users find they can be producing useful drawings in a matter of minutes! In a recent CAD contest only one contestant was able to match our drawing time. The package sold for $3000.00. The other CAD packages took up to twice as long to perform the same drawing and cost up to $5000.00!

Still don't believe us? The goblet pictured below required only 16 keystrokes and 3 commands to create! The top, front, side, and isometric views were created simultaneously . . . in less than one minute!

VERY LOW PRICED

The first question asked by many people is, "Why is DesignCAD 3-D priced so low?" The answer? After developing DesignCAD 3-D version 2.0, we were unable to decide how the product should be priced. We consulted experts. We used the finest spreadsheets on the market. We took employee polls. Finally, in the great American Tradition, we said, *"Aw . . . What the Heck! Let's see the other guys beat this price!"* DesignCAD 3-D version 2.0 sells for $399.



DesignCAD 3-D only $399!

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There is a very important reason to buy DesignCAD 3-D. PERFORMANCE. No other CAD system can match our price/performance ratio. Many people make the serious mistake of thinking that it is necessary to spend thousands of dollars to obtain "a good 3-D CAD system." This is not true! We talk to people everyday that are sadly disappointed with their "expensive" CAD systems. Don't be one of them! Call us and we will send you a complete set of literature and a free slide show demo disk. Once you compare DesignCAD 3-D version 2.0 with other CAD systems we know you will choose DesignCAD 3-D.

DON'T TAKE OUR WORD FOR IT

Here is what other people have to say about DesignCAD 3-D:

"After you've worked with DesignCAD, the single keystroke commands are simple to remember and it becomes easy to "flick one key" to execute a command. An extremely ergonomically designed program."

HENRY LEVET, Levet & Daigle Architects - New Orleans, LA
Designed a 65,000 sq. ft. nursing home using DesignCAD

"Recently I worked with a firm that builds decks. They purchased your product on my recommendation. I sat down with them and in two hours they were very proficient in DesignCAD. Now they are more effective; and we can communicate . . . it's wonderful to be able to do a block repeat 42 times and there are 42 2x4's to make the deck!"

J. TURNER, Architect, TAO Ltd. - The Woodlands, Texas

"Allows scientists and engineers to expend minimum time learning and using CAD software so that their time can be expended on the project at hand. It also allows scientists and engineers to quickly present to management all views of a subject. (3-D)."

DR. STEVENS, NASA Space Scientist/Engineer

HOW DO I GET ONE?

DesignCAD 3-D version 2.0 is available from most retail computer stores, or you may order directly from us. DesignCAD 3-D is available in a number of foreign languages from distributors throughout the world. All you need to run DesignCAD 3-D is an IBM PC Compatible and 640K RAM. DesignCAD 3-D supports most graphics cards, printers, plotters and digitizers. Free information and a demo diskette are available by contacting us at:

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TELEX: 9102400302

Circle 306 on reader service card

THE UPGRADE PATH

Hands-on advice for upgrading PCs, compatibles, and peripherals

The Compaq Portable lives!—thanks to a new 80386 motherboard.

Robert Luhn

New Life for the Compaq Portable

In these high-tech, 33-MHz times, the old Compaq Portable may seem destined for the Boston Computer Museum. But to the former Intel engineers who run Hauppauge Computer Works, it's the raw material that you can mold into a powerful 80386 machine with their $1495 386 Motherboard/CQ16.

Keep in mind that turning a Compaq Portable (or Portable Plus) into a screamer with this replacement motherboard isn't the easiest or cheapest route to 386 power. For example, you could pop an Intel Inboard 386/PC turbo board with 1MB of RAM into a free slot and be out only $895. But the Motherboard/CQ16 turns your Compaq into a complete 16-MHz 80386 system, featuring an Award BIOS, an 80387 socket, 1MB of 32-bit motherboard RAM (expandable to 14MB), five slots (two 8-bit and two 8/16-bit, plus one 8/32-bit memory slot), and full compatibility with 386-based software. No 386 turbo board offers all these features.

Adding the 386 Motherboard/CQ16 to the Compaq is no two-step upgrade. A Compaq Portable is like an "efficiency" kitchen—components are crammed cheek by jowl into an impossibly small space. To replace its antique motherboard, you must maneuver your hands into miniature nooks and remove access plates, cables, and boards.

If you've installed boards and know your way around the inside of a Compaq, you can tackle this upgrade. Just be prepared to wing it on occasion, because Hauppauge's user manual is missing steps and lacks Compaq-specific illustrations—holes the company pledges to patch soon. Tools of this upgrade: small flat-blade and Phillips screwdrivers, and needle-nose pliers; a set of nut drivers is highly recommended.

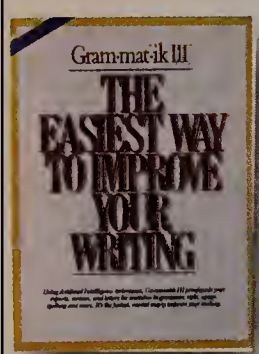
Park any installed hard disk, turn off the system, remove all external cables, lock the key-

(continues)

FRED STIMSON

Hauppauge's 386 Motherboard/CQ16 slides into the bottom of the Compaq Portable.

Finally, Software That Solves You're Writing Problems.



Grammatik III is the easy way to eliminate thousands of common writing errors: from simple mistakes like using "you're" when you mean "your," to hard-to-catch mistakes like subject/verb disagreement. It's IBM PC software that improves all of your writing fast... as you use it.

Grammatik III uses Artificial Intelligence to proofread your writing for errors in grammar, style, usage, and punctuation. It checks for passive voice, incomplete sentences, improper verb usage, and much more. As it checks, it shows writing errors in context, right on your screen. Then, it offers suggestions for improvement and lets you revise your document immediately, without going back to your word processor. It's really that easy.

PC MAGAZINE *EDITOR'S CHOICE—5/27/86*

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Circle 282 on reader service card

board in place over the monitor, and set the system on a flat surface with the front facing you. Then follow the steps you'd normally take to install any board. Lean over and pry off the top panel with your fingernails or a flat-blade screwdriver—*don't* pop it off by giving it a karate chop like macho PC techs of old used to do. Loosen the screws on the perforated metal cover that shields the motherboard, and slip it off. The cover may be secured to the Compaq's disk controller with plastic clips, so gently rock the plate to get it off. Remove all expansion boards, and carefully unplug the cables attached to the video and disk controllers.

Before you can evict the Compaq's motherboard, you must first detach power, keyboard, and speaker cables. Flip the Compaq over with the front still facing you, pry off the panel, and remove the 2-by-7-inch access plate from the top right corner of the system near the handle. Pull off the silver-tipped, white, and black connectors that plug into the base of the motherboard. If one won't budge, insert a small flat-blade screwdriver between the connector and the motherboard, and gently twist until the connector pops off.

To remove the motherboard, turn the Compaq on its face (with the handle pointing up, as if you were going to carry it away), and locate the 15-by-1-inch metal plate near the handle. Remove the screws, gently pull up, and the old motherboard slides right out.

To install the Hauppauge motherboard, reverse the process. A few notable exceptions: Before you pack the old motherboard away, transfer its mounting bracket to the CQ16. Then turn the old motherboard on its side, remove the plastic feet attached to the underside, and plug them into the CQ16. If they resist removal, take a pair of needle-nose pliers, pinch their tops, and twist and push them out.

Finally, locate the blue toggle switch at the edge of the CQ16—ignore the manual's confusing edict to "set jumper switch SW1"—and flip the switch away from the white power connector. This position selects the Compaq's standard monochrome graphics video mode. Slide the CQ16 board into the Compaq, reconnect the cables, connect a supplied system battery to the pins next to the speaker connector, and snap the bottom lid back onto the system. The manual then directs you to turn the system on (several beeps indicate all is well), turn it off, reinstall the video adapter, run a simple menu-driven setup program, then finish reassembling the system. If you turn the machine on and it stops in midboot, make sure the video mode that you set with the toggle matches the one you specified with the setup program.

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Just remember that your revamped Compaq won't live up to its 386 potential without some further—and possibly expen-

(continues)

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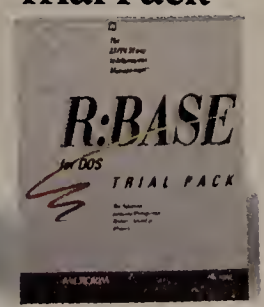

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sive—upgrades. Hauppauge strongly recommends you upgrade the Compaq Portable's original power supply immediately with the $169 CP160 from PC Power and Cooling of Bonsall, California. For performance' sake, you'll eventually want to replace any aged hard disk and controller and maybe add more high-speed memory. (Naturally, only Hauppauge memory boards work with the CQ16. But you can shave costs by buying an unpopulated board from Hauppauge and adding RAM chips to it.)

You may also need a high-capacity floppy drive, since *Windows/386* and other 386-specific programs are distributed on 1.2MB or 720K floppy disks. Although floppy drives for the Compaq are cheap, installing them is a nightmare. Take *that* upgrade to the experts at your friendly neighborhood computer store and let them sweat it out.

WHERE TO BUY

386 Motherboard/CQ16
Houppouge Computer Works, Inc.
175 Commerce Dr.
Hauppauge, NY 11788-3920
800/443-6284, 516/434-1600
LIST PRICE: $1495; unpopulated RAM boord $295, 2MB RAM boord $1095, 4MB $1495, 8MB $2695; unpopulated piggyback boord $195, 1MB piggybock board $595, 2MB $995, 4MB $1345, 8MB $2495
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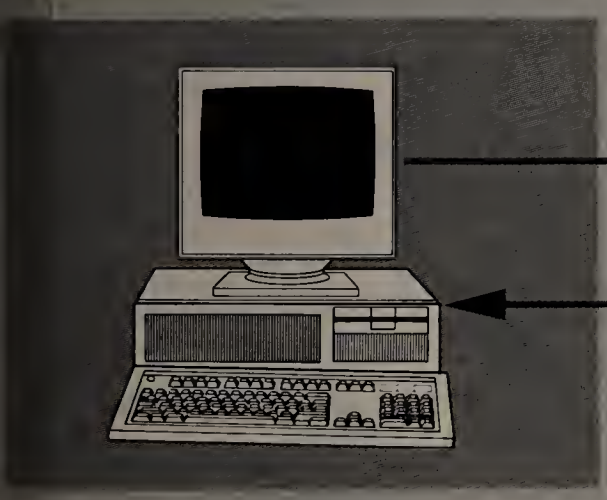

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Load huge Turbo Pascal arrays, set the system date automatically on clockless computers, form feed directory printouts, find files containing specified text patterns, and pick up a C development system for next to nothing.

Edited by Tom Swan

If the Array Fits, Load It

Whenever I try to create an array large enough to hold more than 64K of data using *Turbo Pascal 4.0*, the compiler balks and issues a 'Structure too large' error message. I solved the problem by creating an array of pointers that reference records, each containing two individual string arrays. BIGARRAY.PAS demonstrates the technique [see **LISTING 1**]. You can construct similar arrays in your own programs—just be sure to use an index range of 0 to ArraySizeMinus1 so that the MOD operator can calculate the correct index values.

Stephen Piatak
Moline, Illinois

Editor's note: To test BIGARRAY.PAS, compile the program to disk with Turbo Pascal 4.0 *or* 5.0 *and create a sample input text file named SAMPLE.DAT that contains the text in* **FIGURE 1**. *With both files in the current directory, type BIGARRAY <SAMPLE.DAT. BIGARRAY reads in the text file, stores the strings in individual record arrays, stores their pointers in array 'a', then retrieves the data and prints it on the screen.*

(continues)

```
(* Turbo Pascal Large Arrays--by Stephen Piatak *)
program BigArray;
const RecordSize = 51200;
      ArraySize = 100;
      ArraySizeMinus1 = 99;
type  Str255 = string[ 255 ];
      StrArray =
         array[ 0 .. ArraySizeMinus1 ] of Str255;
      Aptr = ^Arr;
      Arr = record
               name : StrArray;
               address : StrArray
            end;
var   a : array[ 0 .. 10 ] of Aptr;
      i, j, counter : word;
begin
   (*----- Read input into big array -----*)
   i := 0;
   counter := 0;
   while ( maxavail > RecordSize ) and
         ( not eof( input ) ) do begin
      new( a[ i ] );
      j := 0;
      while ( j < ArraySize ) and
            ( not eof( input ) ) do begin
         readln( a[ i ]^.name[ j ] );
         readln( a[ i ]^.address[ j ] );
         inc( j )
      end; (* while *)
      counter := counter + j;
      inc( i )
   end; (* while *)
   (*----- Write big array to output file ----- *)
   writeln;
   for i := 0 to counter - 1 do
      with a[ i div ArraySize ]^ do
         writeln(
            i:5, ': ', name[ i mod ArraySize ]:30,
            address[ i mod ArraySize ]:40 )
end.
```

LISTING 1: BIGARRAY.PAS demonstrates how to create huge arrays in Turbo Pascal.

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FIGURE 1: SAMPLE.DAT sample data file for BIGARRAY.PAS

Locating a given array element for printing involves two steps. First, to choose the correct array, the program divides the overall index value by the array size using the DIV operator, as in the 'with...do' statement near the end of the program. Then, to find the desired record in that array, the program applies the MOD operator to the overall index. For example, if the overall index value is 345 and the array size is 100, BIGARRAY.PAS selects an individual array by using 345 DIV 100. The result of this calculation is 3. BIGARRAY.PAS then uses the expression 345 MOD 100, getting a result of 45, to calculate the index number for the individual arrays inside the records.

Hickory Dickory DOS

Lacking a clock/calendar card in my XT clone, I added the following commands to my AUTOEXEC.BAT file:
GWBASIC DATE1
DATE
GWBASIC DATE2
Since I often turn my system on and off several times daily, this saves me from retyping the system date over and over.

DATE1.BAS [see **LISTING 2**] automatically resets the computer's system date to the date I entered when the computer was most recently booted. That date is stored in a text file named DATE.DAT. If that date is still valid, I just hit <Enter> when DATE prompts for a new date. Otherwise, I backspace over the incorrect date, type a new one, and press <Enter>. DATE2.BAS [see **LISTING 3**] then stores the new date in DATE.DAT.

Darell Piper
Collinsville, Illinois

Editor's note: Depending on the source of your BASIC interpreter, you may need to substitute BASIC for GWBASIC in the batch file commands. If you have a BASIC compiler, you can compile DATE1.BAS and DATE2.BAS, which will result in much faster execution. Just substitute the commands
*d:\path*DATE1
DATE
*d:\path*DATE2
for Mr. Piper's AUTOEXEC.BAT

```
5 REM DATE1.BAS.
10 ON ERROR GOTO 50
20 OPEN "i",1,"date.dat"
30 INPUT #1,A$
40 DATE$ = A$
50 SYSTEM
```

LISTING 2: DATE1.BAS reads the current date from DATE.DAT.

```
5 REM DATE2.BAS.
10 ON ERROR GOTO 50
20 OPEN "o",1,"date.dat"
30 PRINT #1,DATE$
40 CLOSE
50 SYSTEM
```

LISTING 3: DATE2.BAS stores the current date in DATE.DAT.

commands. d:\path *represents the directory where DATE1.EXE and DATE2.EXE are stored.*

Advanced Directory Printing

Have you ever wanted to print out a directory and automatically advance the paper to the top of the next page? To do so, I wrote DFF.BAT ("Directory With Formfeed"). To create the program, type **COPY CON DFF.BAT**, press **<Enter>**, then enter the following commands, pressing <Enter> after each line.

```
ECHO OFF
DIR %1 %2 %3>PRN
ECHO ^L>PRN ^Z
```

To enter ^L and ^Z, hold down **<Ctrl>** and type **L** or **Z**.

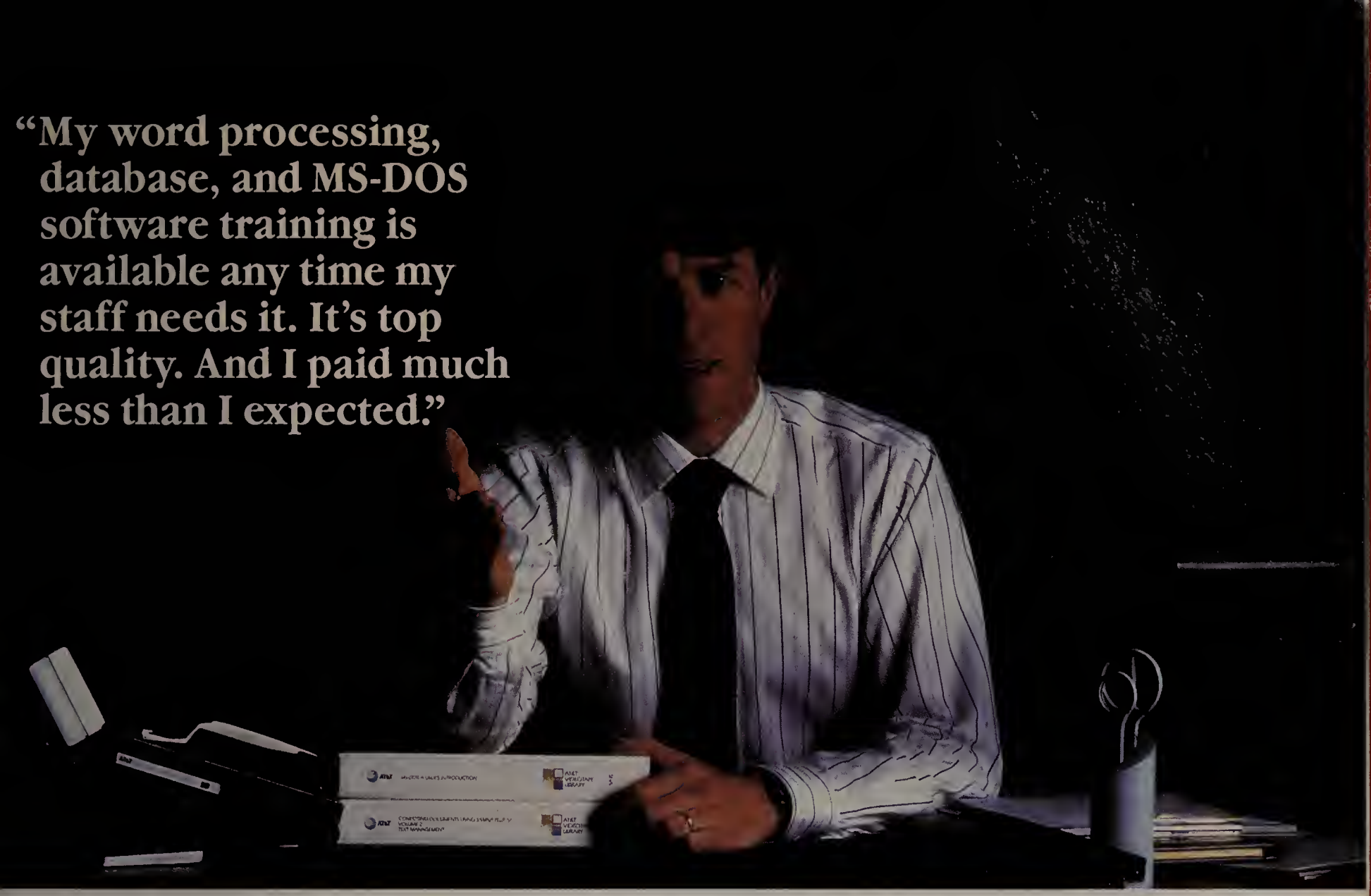
When DFF.BAT runs, the first line temporarily suppresses screen display so the batch file runs invisibly. The second line sends a list of the current directory's files to the printer (unless you specify a different directory). The third line sends the ASCII formfeed code to the printer, advancing the page.

You use DFF.BAT just as you would DIR—DFF to display all files in the current directory, DFF *.EXE to limit display to files with an .EXE extension, and DFF /W for a wide display.

Brian Elwood
Lincoln, Nebraska

Seek and DOS Shall Find

I wrote two utility batch files, one that searches for files anywhere on a hard disk, and another that locates files that contain specified text patterns.
(continues)



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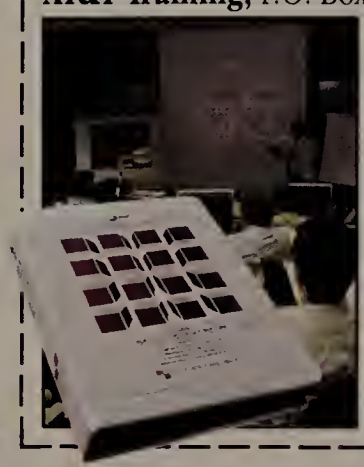

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WHEREIS.BAT [see **LISTING 4**] searches the entire default drive for specific file names. The heart of the batch file is a FIND command that searches the output of a CHKDSK /V command for a specified string. Since CHKDSK output is uppercase, you must enter your search criteria in uppercase. Typing WHEREIS .BAK lists files that have the extension '.BAK'. WHEREIS BAK, by contrast, lists any file or directory name containing the

(continues)

DEVELOPER'S TOOLBOX

A Dream C System for a Song

The best things in life are free: love, sunshine, butterflies—and now *Multi-Edit* from American Cybernetics. In a generous offer that sounds too good to be true, the company is giving away demo copies of its superb text editor, suitable for programming, writing batch files, and plain-ASCII word processing.

I recently discovered *Multi-Edit* among a pile of disks that Andrew Binstock, editor of *The C Gazette*, handed me at Software Development '89 in San Francisco. To get your copy, call up American Cybernetics (tell 'em Tom sent you) and ask for your free disk, which comes with the full working version of *Multi-Edit*, minus only the macro language manual and technical support.

The company is not selling *Multi-Edit* on a pay-as-you-use-it shareware basis—you are welcome to use the product for as long as you like, gratis. Apparently, the company's betting that you'll like *Multi-Edit* so much, you'll cough up the full $99 for the complete commercial program, manual, and one free update. If you're shopping for a text editor, at least try *Multi-Edit*. Why pass up a free lunch?

In that same pile of disks, I came across the *Personal C Compiler (PCC)*, previously known as *DeSmet C*. PCC runs fast, generates remarkably tight code, and compiled all the test programs I fed it. It is a solid C compiler with a well-deserved reputation. You can order the PCC shareware disk directly from C Ware for $8 or download it from the company's BBS, and you can register your copy for $30, which buys you an additional listing utility, an object-code librarian, and a memory manager that's useful for creating large arrays. Documentation plus an 8086/88 assembler are included on disk. Special pricing for students is available. Contact C Ware for details.

One minor drawback with PCC is the lack of a MAKE utility for automating multiple-file compilations. Instead, a clever utility named LATER compares file dates, letting you simulate a MAKE operation using DOS batch files. While LATER is adequate for small projects, a real MAKE utility is a must for larger programs. In the past, I used the MAKE utilities supplied with Borland and Microsoft language products, but I've now switched to the more capable *Opus MAKE*. It is closer to a UNIX MAKE and comes with a dependency generator that has to be seen to be believed. Without a doubt, *Opus MAKE* is the hottest MAKE on the market, despite a $79 price tag. But *Opus MAKE* started out as a shareware program called NDMAKE, which you should still be able to obtain from bulletin boards and shareware distributors.

Together, *Multi-Edit*, PCC, and NDMAKE are a programmer's dream—a full development system for an $8 song! Of course, serious developers should pay for the commercial *Multi-Edit* package, register their copies of PCC, and order the newest version of *Opus MAKE*. But if I were a student on a shoestring, I'd send in my $8 for PCC and write code like mad.

I welcome your comments. My MCI Mail and BIX handle is TSWAN; my CompuServe ID is 73627,3241. —*Tom Swan*

WHERE TO BUY

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C Ware
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805/239-4620
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TECHNICAL SUPPORT: unlimited for registered users, no toll-free number, M–F 9–5
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Opus Software
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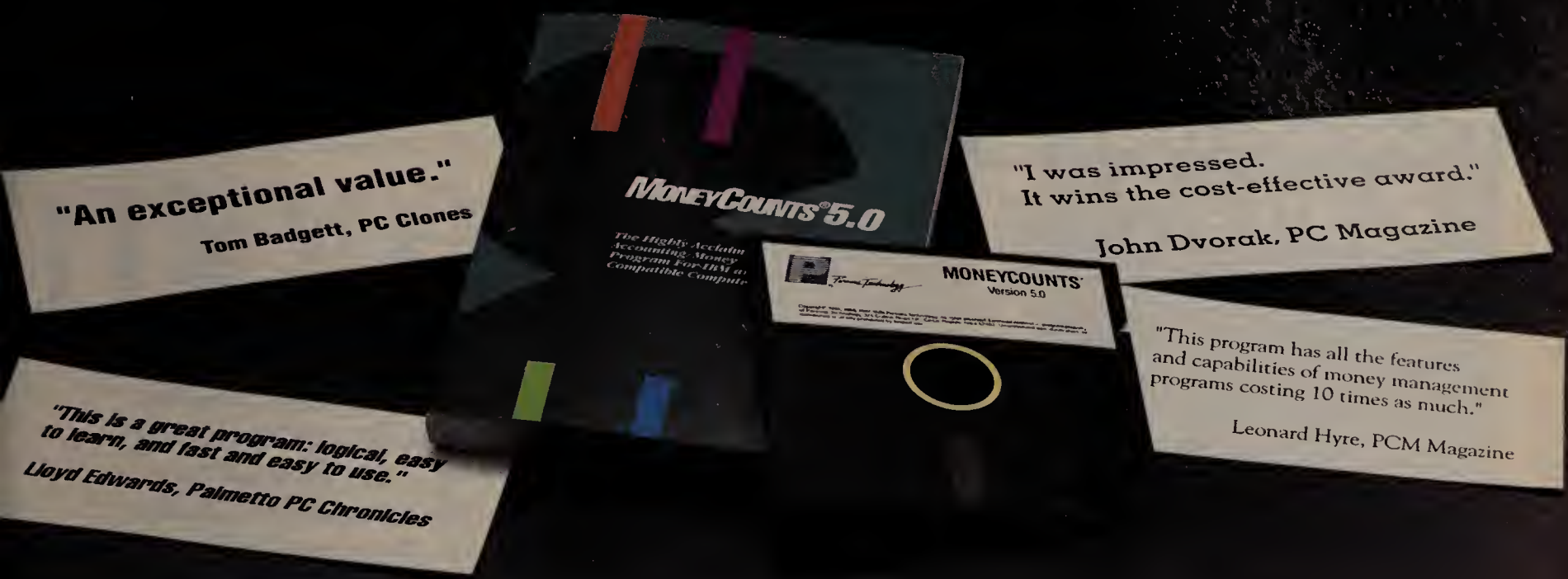

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```
ECHO OFF
IF %1.==. GOTO problem
ECHO .
CHKDSK /v | FIND "%1" | MORE
ECHO .
GOTO done
:problem
ECHO Enter WHEREIS filename
ECHO (wild cards not allowed)
:done
```

LISTING 4: WHEREIS.BAT finds the locations of files on disk.

```
ECHO OFF
IF %1.==. GOTO problem
IF %2.==. GOTO problem
FOR %%i IN (%2) DO FIND "%1" %%i
GOTO done
:problem
ECHO Enter GREP pattern fileset
ECHO pattern = search pattern
ECHO fileset = files to search
:done
```

LISTING 5: GREP.BAT locates text patterns in files in the current directory.

string 'BAK', such as BAKER-.DOC. The program doesn't recognize the * and ? wild cards.

GREP.BAT [see **LISTING 5**] works like the more powerful UNIX utility of the same name and examines files for occurrences of any character string. GREP.BAT can search files in only one directory at a time, and searches are case sensitive, meaning that *bird*, *Bird*, and *BIRD* are treated as different words. Unlike WHEREIS.BAT, GREP.BAT accepts file names in uppercase or lowercase, and you may use wild cards. For example, typing GREP California *.INC lists occurrences of the string 'California' in all files ending with .INC.

The two batch programs assume that the DOS CHKDSK-.COM, FIND.EXE, and MORE-.COM utilities are in a directory listed in the PATH command.

Jeff Richards
Richmond, British Columbia, Canada

Corrections

I found a problem with BIRTHDAY.BAT in "Day In, Day Out" [*Star-Dot-Star, PCW,* February 1989]. DAYNUM should be called after the first REM comment. The correct lines are:
rem ** Month is February (2)
daynum
if errorlevel 23 goto exit

George L. Shevenock II
Pontiac, Michigan

"The Right Stuffer" in the March 1989 *Star-Dot-Star* also contains an error. PRESS.COM is incompatible with the Lotus 1-2-3 Access System, and the command PRESS "LOTUS" CR CR "/FR" won't work as advertised. Instead, use PRESS "123" CR "/FR". —*Ed.*

Tom Swan is a contributing editor for PC World *and the author of* Mastering Turbo Pascal 4.0 *(Howard W. Sams and Co., Indianapolis, 1988) and* Mastering Turbo Assembler *(Howard W. Sams and Co., 1989).*

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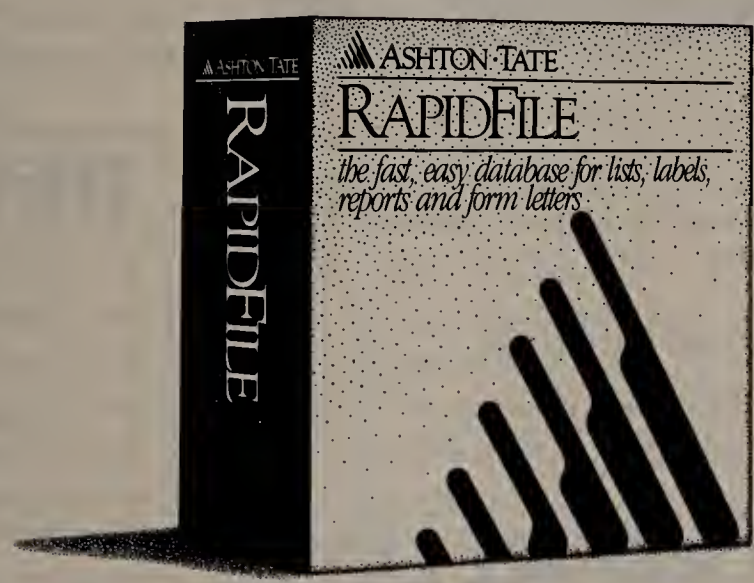

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NETWORK Q&A

Tips and strategies for departmental networking

Backing up your server's data is vital. Choose the right backup system and stick to a schedule, and you'll never fear a network crash again.

David Ferris

Q. *We're having some backup problems on our network. We use IBM's* PC LAN *version 1.24, with 11 IBM PS/2 Model 30 workstations linked to a PS/2 Model 80 server with 2MB of RAM. For backup, we use an IBM 6157 Streaming Tape Drive with Sytron's* Sytos 2.0 *software. Because* PC LAN *requires 350K of server RAM, we can't run* Sytos *without shutting down the LAN. As a result, we back up twice a week instead of daily. Can you suggest any software that will let us back up and restore files without shutting down? What other backup strategies should we consider?*

Robert Steckbeck
Elizabethtown, Pennsylvania

A. Both the backup software and the LAN operating system (LAN OS) need plenty of RAM for buffering, but there's only so much to go around. The solution? Move *Sytos* and the 6157 backup unit to a workstation, and use *PC LAN*'s Net Use command to back up the server files over the network. Because *Sytos*, like most backup software, can't access expanded or extended memory, equip the backup PC with 640K of RAM and strip it of RAM-resident programs. Use your LAN OS to assign the PC as a *redirector* workstation, so there's a minimum of RAM networking overhead.

This approach is usually better anyway. With more RAM available, both the server and the backup system run faster.

Backup to the Rescue

A regular backup regimen ensures that you'll have recent, uncorrupted data on hand in case the server's files are accidentally deleted or corrupted by a network crash. Floppy backup may do for a stand-alone PC, but tape or optical disk backup is essential for a server. Note: With the exception of the *EMQ* program sold with Emerald's Vast Device tape drive, network backup systems back up only the server—not the workstations.

Streaming tape, the most common backup media, is sold in 60MB, 150MB, and 300MB cartridges. If you have a higher-capacity server, you may want to consider helical scan tape drives, WORM (write once, read many) optical drives, and erasable optical drives.

Whatever hardware you choose, you aren't necessarily

(continues)

Backup Technology: What's the Best Deal?

Product	Type	Backup system cost per MB	Media cost per MB	Capacity	Price[1]
Mountain FileSafe 7300	streaming tape	$14.00	$0.19	300MB	$4195
Emerald Vast Device	helical scan tape	$4.00	$0.02	2200MB	$8690[2]
ADIC LANbacker 8000	random access tape	$9.29	$0.57	860MB	$7995
Panasonic LF-5000	WORM optical	$6.76	$0.29	384MB	$2998
Racet Cosmos 600	erasable optical	$11.07	$0.50	600MB	$6645[3]

1 Price includes drive, controller, and basic backup software.
2 Price includes basic server backup software but not $1495 peer-to-peer EMQ option.
3 Backup software not sold with system but supported by $245 NetBack from Cheyenne Software (Raslyn, NY); software price not included.

Plan ahead. If you expect your server storage needs to grow, consider a backup system that can handle it—but make sure your initial outlay will pay off with a lower cost per megabyte.

ANTHONY RUSSO

shackled to the vendor's software. Many third-party programs, such as *Sytos*, work with many different drives.

Backup Software Essentials

The first thing to look for in backup software is compatibility with your LAN OS. Beyond storing data, the software should be able to save LAN OS system files (such as *NetWare*'s bindery data) that define users and assign privileges.

A good package makes it easy to select files and directories to be backed up or restored. Look for a program that lets you automate tasks with batch files and macros. If you plan to back up or restore data while the LAN is running, make sure the program skips open files and automatically returns to them later to try again. Other desirable features include error correction, disk utilities, data compression and encryption, and reporting and search functions that help you track megabytes of archived data.

Tape backup speeds range from 1MB to 5MB per minute, and you can boost speed further by providing plenty of RAM for buffering. Yet even at top speed, backing up a large hard disk can take hours. Most packages can run unattended; you simply set the unit to back up at a certain time. To avoid changing tapes, buy a unit that can hold every file you want to back up. If you expect the LAN to grow, you may want to choose a backup system that can daisy-chain two tape drives, automatically switching to the second when it fills the first. However, it's better to buy a larger device that can accommodate your future needs—daisy-chaining often performs unreliably.

The Hardware Equation

When evaluating backup hardware, consider the following: Does it work with top-notch backup programs? Does its total capacity match your LAN's? Is the media affordable, dependable, and widely available?

Unless you need more than 300MB of storage, stick with streaming tape devices from Archive, Irwin, Maynard, and other vendors. The cost per megabyte is high, but the overall cost is reasonable, and the media is cheap and standardized. And tape capacity is rising—soon you'll be able to buy 3M cartridges that let you store 250MB on a standard 150MB drive.

Mountain's tape offerings are typical—a 60MB external unit costs $1895, a 150MB unit, $2395, and a 300MB unit, $4195. For heftier backup, ADIC's LANbacker 8000 ($7995) acts like a tape backup jukebox, switching among ten 86MB cartridges for a total of 860MB.

Helical scan drives are usually the best high-capacity choice. Brainwave, Racet, and Emerald all sell high-capacity units that pack data onto 8mm videotape. Emerald's Vast Device backs up 2.2GB at up to 15MB per minute. Priced at $7995, Vast costs only $4 per megabyte.

WORM drives are another high-capacity alternative. For example, the $2988 Panasonic LF-5000 holds 384MB on each $115 cartridge—a $7-per-megabyte value. Just remember that you can't erase and reuse the disk. Thus, WORMs are fine for archiving but unfit for daily backup (see *The Hardware Shelf*, *PCW*, June 1989). The new erasable optical drives, such as

(continues)

Backup Strategies You Can Use

Don't let the demands of data backup put you off. Set a schedule and stick to it, and your investment will pay off.

Use the file-by-file option instead of image backup. The latter saves an exact copy of the hard disk—warts and all—but it's slow and often stumbles when used on a LAN.

Back up all targeted files at the end of the week. At the end of every other business day, do an incremental backup of files that have been altered since the weekly backup. You may even want to run an incremental backup twice a day. Clearly mark and date your tapes or disks, and store them in a safe place. After two weeks, start recycling the oldest media in chronological order.

To minimize disk clutter, move seldom-used files onto media that can be archived for several months. It's a good idea to archive files every week by keeping the full weekly backup instead of recycling it.

Proper hardware maintenance will minimize headaches. To keep your tape unit humming, clean its read/write heads with a cotton swab soaked in isopropyl alcohol after every 8 hours of use. Most tape cartridges wear out after 50 full backups, so keep track of how many times they've gone through the wringer. —*D. F.*

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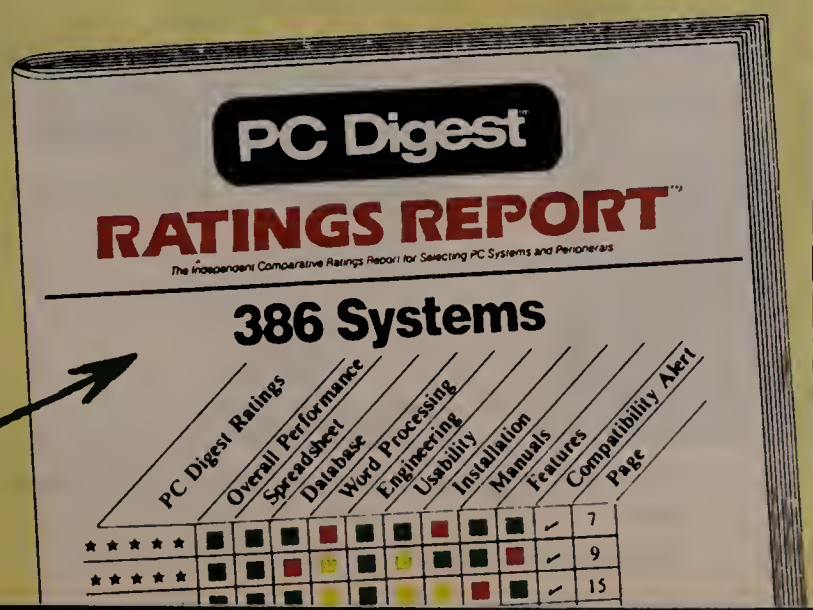

Racet's Cosmos 600 (La Brea, California), may soon be the best alternative. They offer fast access speeds, but few backup programs currently support them.

Although backup and archiving often seem a waste of time, don't take a chance. When your server eventually crashes, be ready with a system and a strategy to meet the crisis head-on.

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David Ferris is the president of Ferris Networks, a San Francisco–based PC dealer specializing in networks.

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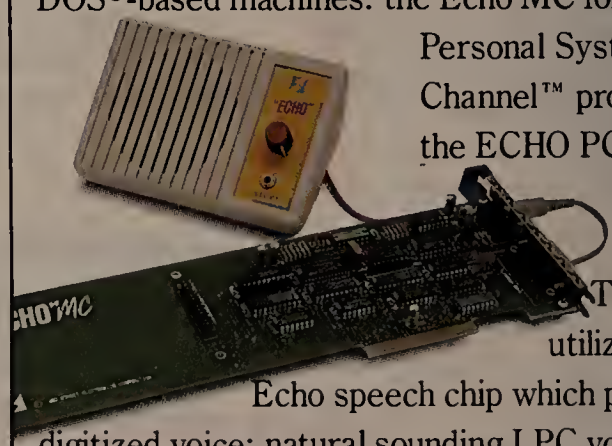

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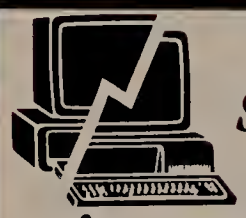

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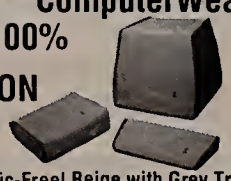

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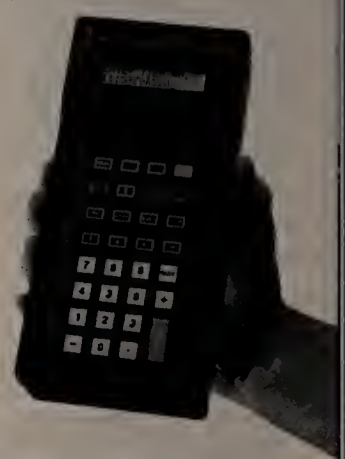

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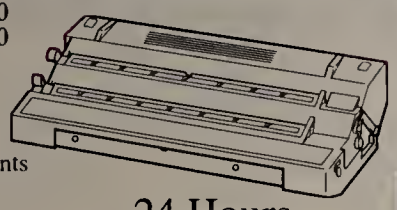

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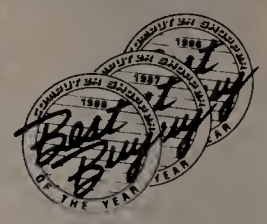

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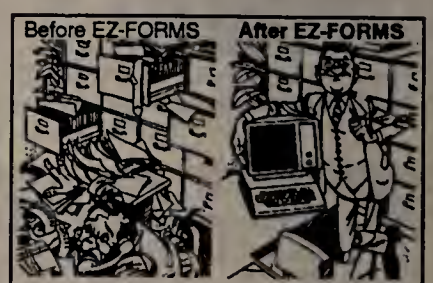

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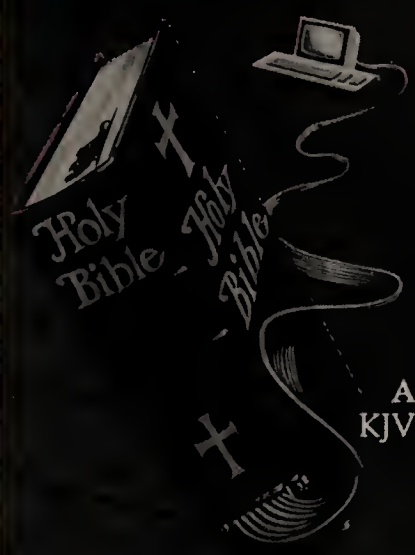

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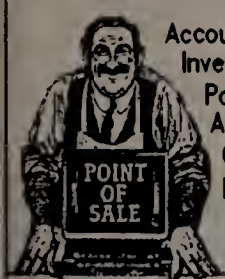

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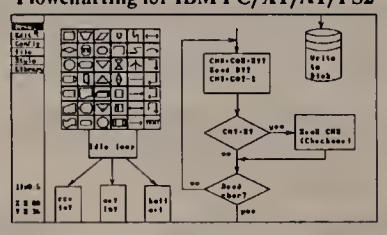

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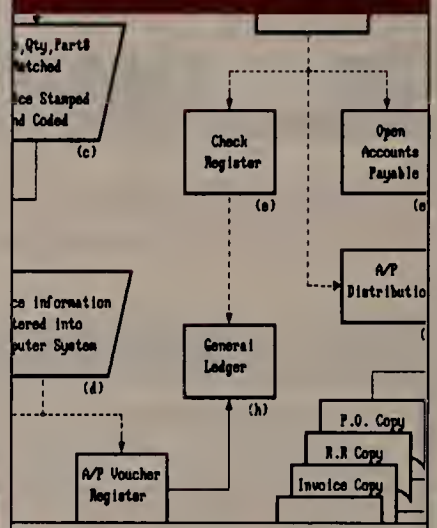

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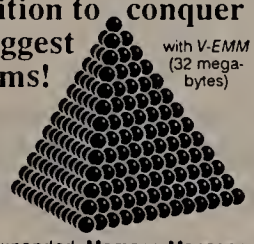

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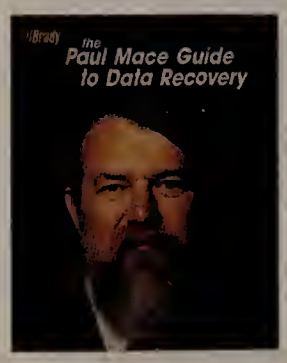

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	1180, 1191	18622	9.95		
	1524 only	18611	15.50	IP657	6.60
	1124 only	18623	16.50		
	** (available in black, red, blue, or brown)				
NEC	P-2200	42999	11.50	IP618	6.30
	P-5200, 5300 (fabric)	42998	15.00		
	P-5200, 5300 (multistrike)	42997	21.00		
	P-5XL, 9XL (fabric)	42996	13.00	IP617	5.00
	P-5XL, 9XL (multistrike)	42995	22.00		
	P-5XL, 9XL (color)	42994	29.00		
OKIDATA	182, 192, 193, 320, and 321	42000	10.00	IP635	3.90
	292E (black fabric)	42001	11.00	IP633	6.00
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	293, 294 (black fabric)	42003	14.25	IP634	7.50
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	393 (black fabric)	42004	25.00		7.50
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	MSP 50, 124	42990	9.25	IP433	3.50
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We offer a complete line of Ink and supplies for the **QUADRAM QUADJET PRINTER.** These products carry the Canon logo and are compatible with other OEM supplies for the Canon 1080A, Radio Shack CGP-220 ink jet printer, and IBM ink jet printer.

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Quadram Quadjet Black Ink Cartridge	10610	$ 13.50	$ 11.00	($4.00)
Quadram Quadjet Color Ink Cartridge	10611	17.00	14.00	(4.00)
Quadram Quadjet Clay-Coated Roll Paper (Box of 4 rolls)	10620	40.00	35.00	(8.00)
Roll Paper (1 case, 10 boxes)	10621	400.00	280.00	(20.00)

SHIPPING ON INK CARTRIDGES IS AS FOLLOWS: 1-2 ($4.00); 3-5 ($6.00); 6-12 ($9.00).

DISKETTES

Sony Diskettes

Sony is the clear choice if you want only the best from your diskettes. Critically certified to be 100% error free, Sony diskettes deliver exceptional accuracy and readability.

SONY

	Sony Prod. #	MicroSell Prod. #	Retail	MicroSell
DSDD 3.5" DISKETTES, for use with 720K drives, 10 to a box	MFD2D	51002	$49.95	$23.50
DSHD 3.5" DISKETTES, for 1.44MB drives, 10 to a box	MFD2HD	51007	74.95	44.00
DSDD 5.25" 360K DISKETTES, 10 to a box	MD2D	51008	12.99	9.60
DSHD 5.25" DISKETTES, for 1.2MB drives, 10 to a box	MD2HD	51004	49.95	27.50

Polaroid Floppy Diskettes

Ever notice how the bizarre has a way of happening at the most inopportune times? That's why Polaroid developed "DataRescue" Diskettes. Now you have a media so fool-proof that data can be recovered from all kinds of accidents, spills and general misuse. So when it comes down to one of those "simple human errors", and hours of work seem lost forever, remember that Data Rescue Diskettes may cost a little more but their value is priceless.

FREE DATA RESCUE SERVICE

"Send your damaged DataRescue Diskette to Polaroid and we can generally recover all the data within 48 hours, and return it to you on a new disk."

	Polaroid Prod. #	MicroSell Prod. #	Retail	MicroSell
DSDD 3.5" DISKETTES, 10 pack, 70% clip level, for 720K drives	608623	51013	$48.95	$18.50
DSHD 3.5" DISKETTES, for 1.44MB drives, box of 10	612394	51014	73.95	43.00
DSDD 5.25" DISKETTES, for 360K drives, box of 10	607339	51015	16.95	9.25
DSHD 5.25" DISKETTES, for 1.2MB drives, box of 10	608622	51016	39.95	15.25

Polaroid Professional Quality Diskettes

Polaroid

DSDD 3.5" DISKETTES, 10 pack, for 720K drives	614454	51017	41.50	17.50
DSHD 3.5" DISKETTES, 10 pack, for 1.44MB drives	614453	51018	69.99	41.95
DSDD 5.25" DISKETTES, 10 pack, for 360K drives	614456	51019	14.95	7.50
DSHD 5.25" DISKETTES, 10 pack, for 1.2MB drives	614455	51020	36.99	13.95

Nashua Diskettes

MADE IN U.S.A.

"Quality" is a word that's rather easily tossed around today. Every manufacturer of diskettes is quick to promise you the highest quality available. But at NASHUA, a U.S. based company located in Nashua, N.H., quality has a much tougher definition; it also means consistency. Time after time, disk after disk, you can depend on Nashua for all your media needs. Lifetime warranty on all diskettes.

	MicroSell Prod. #	Retail	MicroSell
DSDD 3.5" DISKETTES, 10 per box, 720K drives	51021	$28.50	$13.90
3.5" DISKETTES, packed 2 boxes of 10, for 720K drives	51022	57.00	26.00
DSHD 3.5" DISKETTES, 10 per box, for 1.44MB drives	51023	78.90	33.50
DSDD 5.25" DISKETTES, 10 per box, for 360K drives	51024	11.95	5.80
5.25" DISKETTES, 10 per box (plus 1 free preformatted diskette and $5.00 rebate coupon good on next order of preformatted diskettes)	51025	11.95	6.25
5.25" DISKETTES, PREFORMATTED WITH DOS, 10 per box	51031	15.95	8.95
5.25" DISKETTES, packaged 5 boxes of 10 diskettes	51026	59.75	26.45
5.25" DISKETTES, 50 bulk pack with sleeves and labels	51027	49.95	23.75
DSHD 5.25" DISKETTES, 10 pack, for 1.2MB drives	51028	17.95	9.95
5.25" DISKETTES, 10 per case, with hard plastic storage case	51029	19.95	10.85
5.25" DISKETTES, 10 per box, PREFORMATTED WITH DOS to save time	51030	25.95	13.50

TOTAL SHIPPING ON DISKETTES IS AS FOLLOWS: 1-4 BOXES ($4.00); 4-8 BOXES ($6.00); 8-12 BOXES ($8.00).

ORDER HOTLINE
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MOUSE PRODUCTS

LOGITECH

Logitech

The Logitech Mouse is available in both bus and serial versions for IBM PC, XT, AT, PS/2 and compatible systems. Logitech has twice been **PC Magazine's EDITOR'S CHOICE**, yet it is one of the most affordable mice on the market. Lifetime warranty on all Logitech Mouse products.

	Prod. #	Retail	MicroSell	Shipping
NEW DESIGN — LOGITECH SERIAL MOUSE, 320 dpi resolution, new ergonomic shape, includes cables for both standard 9 and 25 pin serial ports as well as a PS/2 cable. "**Mouseware**" software provides adjustable cursor sensitivity, custom menus, and Lotus shell program, while "**Pop-Up DOS**" gives you the ultimate DOS handler	88111	$169.00	$ 99.00	($6.00)
NEW DESIGN — LOGITECH BUS MOUSE, same as above but includes its own interface board, (use this one if you don't have an available serial port)	88112	169.00	99.00	(6.00)
LOGITECH C-7 SERIAL MOUSE, with adapter for 9 or 25 pin ports	88101	119.00	69.00	(6.00)
LOGITECH C-7 BUS MOUSE, with interface card	88105	119.00	69.00	(6.00)
LOGITECH PS/2 MOUSE, 2 button mouse with Plus software on 3.5" diskettes	88108	99.00	79.00	(6.00)
LOGITECH HI REZ MOUSE, 3 button bus mouse with Plus software on 5.25" diskettes	88109	149.00	89.00	(6.00)
LOGITECH SCANMAN, scans a 4.2" x 11" at 400 dpi, ability to scan from images that contain up to 16 colors and display in 16-levels of gray, outstanding for desktop publishing, scans a variety of images including logos, photographs, newspapers, etc., can directly import graphic images into WordPerfect 5.0, Ventura, and PFS First Publisher				
For IBM PC/XT/AT/PS/2 Models 25 or 30	88167	349.00	235.00	(6.00)
For PS/2 Models 50 and higher	88166	399.00	265.00	(6.00)
PAINTSHOW Software	88104	69.99	25.99	(6.00)
LOGICADD Software	88103	89.00	59.95	(6.00)
PUBLISHER Software	88106	79.00	59.95	(6.00)
LOGITECH MOUSE TECHNICAL REFERENCE MANUAL, a full description of mouse specifications/features	88003		5.00	(4.00)
LOGITECH MOUSE PROGRAMMERS TOOLKIT, descriptions and examples of how to use functions from 8086 assembler and high-level languages	88001		25.00	(6.00)

Microsoft Mouse Products

MICROSOFT SERIAL MOUSE, experience the look and feel of the sleek, smooth rolling Microsoft Mouse, package includes adapter for 25 pin, 9 pin, and P/S 2 ports, Microsoft Paintbrush and Mouse Menus, lifetime warranty	88644	169.00	109.00	(6.00)
MICROSOFT BUS MOUSE, same package as above except uses a half card; no serial port needed, lifetime warranty	88645	169.00	109.00	(6.00)
QUADRAM Q-MOUSE, 2-button optical mouse, 9-pin adapter, ready to run with all mouse-ready software applications	10708	149.00	49.00	(7.00)

PORTABLE COMPUTERS

DATAVUE™

EXPANDED DATAVUE 25, PHASE II, expandable to 1.25 MB by just adding chips, built-in mono graphics LCD screen, 80 x 25 lines, tilts to 6 positions with adjustable contrast and brightness, CGA graphics 640 x 200, RGB color and composite output, built in RAM drive to act as a second floppy drive, serial and parallel ports, clock/calendar, 8087 socket and MS DOS 2.11.

	Memory	Prod. #	Retail	MicroSell	Shipping
EXPANDED DATAVUE 25 WITH AMBER GAS SUPERTWIST BACKLIT SCREEN, and 1 - 5.25" drive	768K	10812G	$2245.00	$899.00	($17.00)
EXPANDED DATAVUE 25 WITH AMBER GAS SUPERTWIST BACKLIT SCREEN, and 2 - 3.5" drives	768K	10822G	2345.00	999.00	(17.00)
EXPANDED DATAVUE 25 WITH AMBER GAS SUPERTWIST BACKLIT SCREEN, and 1 - 3.5" drive, and 20 MB internal hard drive (AAT 69 ms)	768K	10832G	3495.00	1699.00	(20.00)

Portable Accessories for Datavue 25

INTERNAL BATTERY KIT, lasts approximately 1 hour, not for use with hard drive model	10803	65.00	49.00	(5.00)
EXTERNAL BATTERY KIT, lasts approximately 4 hours, for use with hard drive model	10817	125.00	119.00	(8.00)
HEAVY-DUTY EXTERNAL BATTERY AND AUTO ADAPTER, 6-8 hour life when used with hard drive models, includes shoulder carrying case and plug-in auto adapter	13803	299.00	195.00	(8.00)
LARGE CARRYING CASE, shoulder strap, carrying handle, pocket for papers & disks	10814	50.00	42.00	(6.00)
INTERNAL MODEM, 300/1200 baud, Hayes compatible, with software	10806	495.00	329.00	(6.00)
EXTERNAL 5.25" SECOND FLOPPY DRIVE, clips on to the back of unit	10807	349.00	269.00	(6.00)
KEYBOARD CABLE, coiled 6 ft.	10805	15.00	12.00	(4.00)
MECHANICAL KEYBOARD, improved feel and layout	10808	125.00	115.00	(6.00)
RECHARGER CLIP, replacement clip for internal battery	10818	12.50	5.00	(4.00)

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LAPTOP COMPUTERS

DATAVUE™
An Intelligent Systems Company

Datavue

MICROSELL IS AN AUTHORIZED DISTRIBUTOR FOR DATAVUE LAPTOP AND PORTABLE COMPUTERS. AS SUCH, WE CARRY THE COMPLETE LINE OF PRODUCTS AND ACCESSORIES AND CAN OFFER EXPERT SALES AND TECHNICAL ASSISTANCE ON DATAVUE PRODUCTS. WE WILL UNCONDITIONALLY BETTER ANY PRICE ON DATAVUE COMPUTERS OFFERED BY ANY OTHER AUTHORIZED FULL LINE DEALER.

DATAVUE SPARK, an IBM compatible **AC or BATTERY OPERATED** laptop computer ideal for Spreadsheets, Database, or Word Processing, weighs only 10 lbs., speed switchable between 4.77 and 9.54 MHZ, includes serial and parallel ports, RGB port and composite port, clock/calendar, math coprocessor socket, and MS DOS 2.11. The unique **"GO ANYWHERE"** power supply provides true world wide compatibility. It will automatically adjust for any power source from 90 to 246 VAC. (50-60 Hz.) Power surges and drops are absorbed internally to provide a safe worldwide power supply.

"The Speed is due to the Spark's NEC V20 processor. It runs at 9.54 MHZ, racing through my word processing and spreadsheet tests respectively 70 and 90 percent faster than a plain IBM PC." — PORTABLE COMPUTER REVIEW

	Prod. #	Retail	MicroSell	Weight*	Shipping
DATAVUE SPARK, 384K with (1) 3.5" 720K floppy, LCD supertwist screen, and AC adapter	13811	$ 995.00	$ 799.00	10.3 lbs.	($15.00)
DATAVUE SPARK, 384K with (1) 3.5" 720K floppy, EL backlit supertwist screen, and AC adapter	13816	1095.00	849.00	10.3 lbs.	(15.00)
DATAVUE SPARK, 640K with (2) 3.5" 720K floppies, LCD supertwist screen, and AC adapter	13812	1325.00	995.00	10.3 lbs.	(15.00)
DATAVUE SPARK, 640K with (2) 3.5" 720K floppies, EL backlit supertwist screen, and AC adapter	13822	1450.00	1099.00	10.3 lbs.	(15.00)
DATAVUE SPARK, 640K with (1) 3.5" 720K floppy, 20 MB hard drive, EL backlit supertwist screen, and AC adapter	13813	2195.00	CALL!	13.5 lbs.	(16.00)
COMPLETE LAPTOP PACKAGE:					
SPARK LAPTOP COMPUTER 640K, (2) 3.5" 720K floppies, EL backlit screen	13822	2159.00	1223.00	13.8 lbs.	(18.00)
SPARK CARRYING CASE	13814				
SPARK HEAVY DUTY 1.7 AH BATTERY	13802				

DATAVUE SNAP 1+1, weighs only 10 lbs., speed switchable between 4.77 and 9.54 MHZ, up to 6 hrs. computing time, an **IBM compatible half card slot**, includes serial and parallel ports, clock/calendar, RGB and composite ports, math coprocessor socket, AC adapter and MS-DOS 2.11.

"The only BATTERY PORTABLE LAPTOP with an IBM COMPATIBLE HALF CARD SLOT available for expansion." COMPUTER GUIDE

DATAVUE SNAP 1+1, 640K with (2) 3.5" 720K floppies, LCD supertwist screen, and AC adapter	14812	$2295.00	$1385.00	11.3 lbs.	($16.00)
DATAVUE SNAP 1+1, 640K with (2) 3.5" 720K floppies, EL LCD supertwist screen and AC adapter	14822	2395.00	1450.00	11.3 lbs.	(16.00)
DATAVUE SNAP 1+1, 640K with (2) 3.5" 720K floppies, Gas Light EL LCD supertwist screen, and AC adapter	14832	2495.00	1525.00	11.3 lbs.	(16.00)
DATAVUE SNAP 1+1, 640K with (1) 3.5" 720K floppy, 20 MB hard drive, LCD supertwist screen, and AC adapter	14813	3495.00	2005.00	16.3 lbs.	(18.00)
DATAVUE SNAP 1+1, 640K with (1) 3.5" 720K floppy, 20 MB hard drive, EL LCD supertwist screen, and AC adapter	14823	3595.00	2195.00	16.3 lbs.	(18.00)
DATAVUE SNAP 1+1, 640K with (1) 3.5" 720K floppy, 20 MB hard drive, Gas Light, EL LCD screen, and AC adapter	14833	3695.00	2299.00	16.3 lbs.	(18.00)

*All weights are close approximates

LAPTOP ACCESSORIES FOR SPARK & SNAP

SPARK BY DATAVUE — Snap 1+1

		Prod. #	Retail	MicroSell	Weight*	Shipping
INTERNAL BATTERY 1.3 AH, approximately 4-6 hour life		13801	$ 60.00	$ 55.00	1.5 lbs.	($6.00)
INTERNAL BATTERY 1.7 AH, approximately 6-8 hour life		13802	99.00	69.00	1.5 lbs.	(6.00)
EXTERNAL BATTERY 5.0 AH, approximately 5-8 hour life with Hard Drive models, includes shoulder carrying case, plug in auto adapter, and DC to AC converter		13803	299.00	195.00	5.0 lbs.	(9.00)
CARRYING CASE, please specify style:	SPARK	13814	95.00	55.00	2.0 lbs.	(6.00)
	SNAP	14814	95.00	55.00	2.0 lbs.	(6.00)
NUMERIC KEYPAD, plugs into the parallel port, has a 33 key pad		13817	199.00	129.00	2.0 lbs.	(6.00)
DOS 3.3 UPGRADE, special version for Datavue laptops		13818	109.00	99.00	1.0 lbs.	(6.00)
DATAVUE PORTABLE FAX, now you can send and receive a FAX message on the go! Just plug it into your laptop or desktop serial port and insert any ordinary RJ11 phone cable and you are ready with a fully supported GROUP III 4800 baud FAX. As you receive incoming FAX's they can be displayed on screen, stored to disk, or printed on a dot matrix printer, supports most word processing software and graphic files, includes AC adapter and cable		13807	499.00	325.00	3.0 lbs.	(6.00)
EXTERNAL 5.25 SECOND FLOPPY DRIVE		14807	395.00	335.00	1.0 lbs.	(6.00)
HOLMES CORRESPONDENT MODEM, 1200 baud internal modem, Hayes compatible, with software and manuals	SPARK	13101	399.00	229.00		(6.00)
	SNAP	13103	399.00	229.00		(6.00)
HOLMES CORRESPONDENT MODEM, 2400 baud internal	SPARK	13102	495.00	309.00		(6.00)
	SNAP	13104	495.00	309.00		(6.00)

ACCESSORIES FOR SPARK ONLY

	Prod. #	Retail	MicroSell	Weight*	Shipping
INTERNAL 3.5" FLOPPY, 720K to add second floppy to one drive unit	13809	$195.00	$149.00	4.0 lbs.	($7.00)
256K MEMORY UPGRADE, to increase 384K Spark to 640K	13808	130.00	109.00	2.0 lbs.	(6.00)
20 MB HARD DISK, Replaces one floppy drive with a 20 megabyte 35 MS hard drive (Unit must be returned for installation)	13805	800.00	CALL!		

*All weights are close approximates

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LAPTOP COMPUTERS Continued

Toshiba "THE ULTIMATE IN PORTABLE COMPUTER PERFORMANCE"

	Prod. #	Retail	MicroSell	Shipping
TOSHIBA T1200, 4.77/9.54 MHZ selectable, 1 MB RAM (640K plus 384K LIM-EMS memory), PAR/SER/RGB composite/ keypad port, runs up to 7 hours on a full charge, price includes battery. Available as a (2) floppy drive system (720K 3.5") or a (1) floppy drive with a 20 MB hard disk				
T1200F, (2) floppies	10902	$3100.00	**$1750.00**	($15.00)
T1200F8, (2) floppies with EL backlit screen	10903	3650.00	**2050.00**	(15.00)
T1200H0, with 20 MB hard disk and (1) floppy	10904	3499.00	**2299.00**	(15.00)
T1200H8, same as above with backlit screen	10905	3999.00	**CALL!**	(15.00)
TOSHIBA T1600, 80286 based laptop, 12MHZ with 27MS, 20MB drive, (1) 1.44MB 3.5" floppy, 1MB of RAM memory and an EGA compatible backlit supertwist screen, (2) RS-232 ports, Toshiba's most powerful battery-powered laptop	10897	4999.00	**3500.00**	(15.00)
TOSHIBA T3100e, upgraded version of the popular 3100/20, 80286 based 4/8 MHZ selectable, (1) 720K 3.5" floppy, 640K expandable to 2MB, SER/PAR/RGB ports, EGA gas plasma screen	10898	4699.00	**3025.00**	(15.00)
TOSHIBA T3200, 80286 based laptop, 6/12 MHZ switchable, 1 MB RAM installed expandable up to 4 MB, 40 MB hard drive, (1) 720K 3.5" floppy, EGA/PAR/SER ports, gas plasma display, 2 IBM compatible slots	10907	5799.00	**3900.00**	(15.00)
TOSHIBA T5100, 80386 based laptop, 8/16 MHZ selectable, 2 MB RAM memory installed, 40 MB hard drive, (1) 1.44 MB 3.5" floppy, PAR/SER/EGA ports, EGA gas plasma display, IBM compatible slot	10908	7499.00	**5149.00**	(18.00)
TOSHIBA T5200, new flagship laptop boasting a 80386 20 MHZ processor, 2 meg. on board memory, 40 MB hard disk, (1) 1.44 MB floppy, 101 keyboard, PAR/(2)SER/VGA ports	10899	9499.00	**CALL!**	
TOSHIBA T5200, same as above with 100 MB (25MS) drive	10900	10999.00	**CALL!**	

LAPTOP ACCESSORIES FOR TOSHIBA

CARRYING CASE, please specify model:

Model #	Prod. #	Retail	MicroSell	Shipping
T1000	10909	$59.00	**$49.00**	($6.00)
T1200	11000	59.00	**49.00**	(6.00)
T3100	11001	79.00	**65.00**	(6.00)
T3200	11002	99.00	**80.00**	(6.00)
T5100	10913	99.00	**80.00**	(6.00)

INTERNAL MODEM, 300/1200 BAUD, Hayes compatible, please specify model number:

Model #	Prod. #	Retail	MicroSell	Shipping
T1000	10914	$399.00	**$299.00**	($6.00)
T1200	11003	399.00	**399.00**	(6.00)
T5100	11004	425.00	**310.00**	(6.00)

NUMERIC KEYPAD, 17 key pad, please specify model:

Model #	Prod. #	Retail	MicroSell	Shipping
T1000	11005	99.00	**79.00**	($6.00)
T3100	10918	99.00	**79.00**	(6.00)

TOSHIBA

MITSUBISHI LAPTOP

MITSUBISHI ELECTRONICS

	Prod. #	Retail	MicroSell	Shipping
MITSUBISHI MP286L, 80286 based world traveler with switchable AC power supply (115V/60hz and 230v/50hz), (1) 1.44MB floppy drive, (2) SER/(1) PAR ports, page white LCD backlit screen, 20MB hard disk. Selectable speeds 6/8/12MHZ, 640K expandable to 2 MB	12007	$3995.00	**$2490.00**	($15.00)
MITSUBISHI INTERNAL MODEM, 2400 baud	12008	499.00	**345.00**	(6.00)

LAPTOP COMPANION PRODUCTS

	Prod. #	Retail	MicroSell	Shipping
DICONIX 150 PORTABLE INK JET PRINTER, 150 CPS draft, 50 CPS NLQ, up to 90 pages on a single charge, friction and tractor feeds, will do envelopes and transparencies, parallel, weighs 3.5 lbs.	17201	$479.00	**$349.00**	($7.00)
DICONIX 150 CARRYING CASE, padded case with logo	17203	60.00	**29.95**	(5.00)
DICONIX 150 INK CARTRIDGE, replacement cartridge for 150 printer, will do up to 500 pages of standard text	17202	11.99	**10.95**	(4.00)
AXONIX THINWRITE 100 PORTABLE PRINTER, 100 CPS draft, 25 CPS NLQ, dot matrix impact printer, will do multicopy forms, graphs, prints on any paper, serial/parallel interface, includes NI-CAD batteries and AC charger, weighs 6 lbs.	17204	525.00	**425.00**	(9.00)
TRACTOR FEED FOR AXONIX 100	17207	55.00	**24.95**	(7.00)
AXONIX REPLACEMENT RIBBON CASSETTE	17208	13.00	**9.95**	(4.00)
LAP-LINK PLUS, for fast easy two-way transfers from 5.25" to 3.5" drives, unique split screen file locator, nominated by **PC MAGAZINE** for utility excellence award, PS/2 compatible	64507	129.95	**89.00**	(6.00)
DATAVUE DISK WALLET, nylon disk holder in wallet design with velcro closures, holds 9 - 3.5" diskettes	10820	19.95	**9.95**	(4.00)
NYLON LAPTOP CARRYING CASE, built for active use with high quality "ballistic nylon" covering, padded impact-resistant foam lining and interlocking buckle closures, big front pocket stores disks, power pack and manuals, 14-3/4" (L) x 14" (H) x 3-1/2" (W) size fits many laptop computers	17209	69.00	**42.50**	(6.00)
CLASSIC LEATHER LAPTOP+ CASE, rich, black, full grain cowhide design with fully padded main section, double stitched and reinforced with industrial rivets. Adjustable dividers provide secure compartments to hold computer, power supplies and accessories, while a separate portfolio features individual disk pockets, pen holders, business card holder and document pouch, a large exterior padded pouch provides enough room for a portable printer, modem, or additional work, 14-1/2" x 16-1/2" x 4"	17210	299.00	**129.00**	(8.00)
QUADRAM J.T. FAX, 4800 baud internal HALF SIZE CARD, **PC Magazine's "EDITOR'S CHOICE"**, easiest to use with on-line help, Group III compatible and on the fly conversion	10230	399.00	**299.00**	(7.00)

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LAPTOP COMPANION PRODUCTS Continued

External Modems

	Prod. #	Retail	MicroSell	Shipping
WORLOPORT 2400, World's smallest external modem, **PC Magazine's "EDITOR'S CHOICE"**, with diagnostic LED'S, built in speaker, and switchable AC or battery power (both are included), can interface directly with acoustic couplers (see below) or standard RJ11 telephone jack, 100% Hayes compatible, includes Carbon Copy Plus software and two year warranty, 4" x 2.4" x 1"	63000	$359.00	$279.00	($7.00)
ACOUSTIC COUPLER, Handy acoustic coupler for use with modems, allows connection of modems to the handset; both round and square. A must item for the business traveler!	62009	99.00	69.00	(4.00)
MIGENT POCKET MODEM, 1200 baud, Hayes compatible, battery operable, AC adapter included, with both 9 pin and 25 pin RS-232 connectors, the alternative choice for all portables	24101	159.00	99.00	(6.00)
LAPTOP CAR SEAT, for those who spend a lot of time on the road, this sturdy molded plastic laptop holder provides easy access to your computer. Attaches to the front seat using seat belts, while the molded lips, velcro bottom and elastic cord hold the laptop in place facing the driver. Will hold any laptop computer up to 15" x 20". The ultimate in ease of entry and retrieval while traveling.	17502	99.00	59.95	(8.00)

ALL OUR PRINTERS COME WITH A FREE PARALLEL PRINTER CABLE — WHILE SUPPLY LASTS!

PRINTERS

Printers — 9-Pin Dot Matrix

	CPS-NLQ/ DRAFT	Width	Buffer	Interface	Compatibility	Tractor	Prod. #	Retail	MicroSell	Shipping
PANASONIC 1180	24/120	80	2K	PAR.	IBM/EPSON	Y	18598	$299.00	$190.00	($10.00)
STAR NX1000	36/144	80	4K	PAR.	IBM/EPSON	Y	46006	299.00	185.00	(10.00)
STAR NX1000 RAINBOW	36/144	80	4K	PAR.	IBM/EPSON	Y	46007	410.00	259.00	(10.00)
CITIZEN 1200	25/150	80	4K	PAR.	IBM/EPSON	Y	16007	229.00	169.00	(10.00)
CITIZEN 1800	29/180	80	4K	PAR.	IBM/EPSON	Y	16001	299.00	189.00	(10.00)
PANASONIC 1191	32/196	80	6K	PAR.	IBM/EPSON	Y	18599	329.00	265.00	(10.00)
PANASONIC 1092I	48/240	80	6K	PAR.	IBM/EPSON	Y	18604	529.95	335.00	(12.00)
PANASONIC 1592	38/180	136	7K	PAR.	IBM/EPSON	Y	18605	679.95	439.00	(12.00)
PANASONIC 1595	51/240	136	15K	PAR./SER.	IBM/EPSON	Y	18610	769.95	469.00	(12.00)
STAR NR-10	60/240	80	13K	PAR.	IBM/EPSON	Y	46008	579.00	359.00	(12.00)
STAR NR-15	60/240	136	13K	PAR.	IBM/EPSON	Y	46009	799.00	448.00	(14.00)

Printers — 24-Pin Dot Matrix

	CPS-NLQ/ DRAFT	Width	Buffer	Interface	Compatibility	Tractor	Prod. #	Retail	MicroSell	Shipping
PANASONIC 1124	63/192	80	6K	PAR.	IBM/EPSON	Y	18612	$545.00	$359.00	($12.00)
PANASONIC 1524	67/270	132	13K	PAR./SER.	LQ-1500, IBM	Y	18608	949.00	599.00	(15.00)
NEC 2200	55/170	80	8K	PAR.	LQ-1500, EPSON	Y	43012	499.00	375.00	(15.00)
STAR NX2400	57/170	80	7K	PAR.	IBM/EPSON	Y	46010	529.00	335.00	(15.00)
CITIZEN TRIBUTE 124	66/200	80	24K	PAR./SER.	DIABLO/QUME	Y	16004	699.00	459.00	(12.00)
CITIZEN TRIBUTE 224	66/200	136	24K	PAR./SER.	DIABLO/QUME	Y	16005	999.00	680.00	(15.00)
STAR NB24-10	72/216	80	8K	PAR.	IBM/EPSON	Y	46011	749.00	465.00	(15.00)
NEC 5200	90/175	80	8K	PAR.	EPSON	Y	43009	799.00	569.00	(15.00)
NEC 5300	90/175	136	8K	PAR.	EPSON	Y	43010	1049.00	749.00	(17.00)
NEC 960XL	140/400	136	16K	PAR.	EPSON	Y	43008	1595.00	1115.00	(17.00)
TOSHIBA 341SL	72/216	132	32K	PAR./SER.	IBM/QUME	Y	17603	1049.00	725.00	(15.00)
TOSHIBA 351SX	120/360	132	32K	PAR./SER.	IBM/QUME	Y	17601	1599.00	1275.00	(17.00)

LASER PRINTERS

	Prod. #	Retail	MicroSell	Shipping
NEC LC 890 SILENT WRITER, the **POSTSCRIPT LC 890** is designed specifically to meet the requirements of high-level Graphics-Intensive Desktop Publishing. It features 3 MB of internal memory, 35 resident type-fonts, 256 shade gray scaling, 300 X 300 DPI in 8 PPM, dual 250-sheet paper bins. The LC family employs LED Technology to produce images as sharp as Laser Printers with half the moving parts. Quiet and easy to use, LCD front display panels, features **ADOBE POSTSCRIPT** language interpreter	43502	$4795.00	$3250.00	CALL!
NEC 860 SILENT WRITER, similar to the 890, the 860 provides a 1.3 MB memory board, full-page BIT MAP GRAPHICS at 300 X 300 DPI on 8-1/2 x 11 or 8-1/2 x 14 inch paper, not post-script	43503	3150.00	2350.00	CALL!
PANASONIC KXP-4450 LASER, fastest in its class at 11 PPM, with 300 X 300 resolution, (2) 250 sheet paper bins, 512K RAM memory, easy front panel LCD display, 4 resident fonts, 5000 page-per-month duty cycle	18163	2359.00	1479.00	($45.00)

ORDER HOTLINE
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LASER PRINTER ACCESSORIES

NEC

QUADRAM
An Intelligent Systems Company

Panasonic
COMPUTER PRODUCTS DIVISION

	Prod. #	Retail	MicroSell	Shipping
NEC TONER CARTRIDGE	43504	$ 24.95	$ 21.50	($4.00)
NEC OPC KIT, original equipment by NEC	43505	129.00	117.00	(8.00)
QUADRAM QUADLASER TONER, for all Quadlaser printers,also works with other name brand equipment by: AST, TI, QMS, PCPI, DEC)	10624	99.00	79.00	(8.00)
QUADRAM QUADLASER OPC KIT, for Model LS1100	10625	209.00	169.00	(8.00)
QUADRAM QUADLASER OPC KIT, for Models LS1101, LS1201, LS3000	10628	209.00	169.00	(8.00)
PANASONIC TONER CARTRIDGE, 5000 sheet capacity, (comes with waste bottle and fuser cleaning pad)	18614	69.00	35.00	(5.00)
PANASONIC OPC DRUM UNIT, 20,000 sheet useful life	18615	169.00	145.00	(6.00)
PANASONIC DEVELOPER UNIT	18616	125.00	95.00	(7.00)

PRINT BUFFERS

	Prod. #	Retail	MicroSell	Shipping
QUADRAM MICROFAZER 8K, available in: parallel to serial, serial to parallel, serial to serial, or parallel to parallel; parallel to parallel version expandable up to 128K or up to 512K using the MC128 expansion card, please specify configuration when ordering	10508	$199.00	$159.00	($6.00)
QUADRAM MC128 EXPANSION CARD, for parallel to parallel Microfazer only, 128K installed, expandable up to 384K	10505	295.00	195.00	(6.00)
QUADRAM MICROFAZER II, universal stand-alone print buffer, 64K installed, expandable up to 512K in main unit, uses 256K chips, expandable up to 2 MB using the expansion card listed below	10528	375.00	249.00	(6.00)
QUADRAM MFB512 EXPANSION CARD, for Microfazer II, 512K installed, expandable up to 1.5 MB	10529	595.00	379.00	(6.00)
QUADRAM MICROFAZER VI, intelligent buffering device, choose either 6 serial ports or 4 serial ports and 2 parallel ports, 256K installed, expandable up to 1 MB using the expansion modules listed below, please specify interface configuration when ordering	10556	790.00	499.00	(6.00)
QUADRAM MICROFAZER VI EXPANSION CARD, each module adds 256K	10557	305.00	219.00	(6.00)

TAPE BACKUP from Tallgrass Technologies

TALLGRASS TECHNOLOGIES
COMMITTED TO MEMORY

"When it's worth saving, it's worth Tallgrass"

Why back up on tape you ask? Have you ever put off your diskette-based backup because you did not have the time to insert 112 diskettes for a 40 meg drive? Have you ever typed "Y" when you meant "N" and then it was too late? Have you ever overwritten a file by mistake? How much would it cost to reconstruct your valuable data? **CAN** your data be reconstructed? If there was a fire, theft or other catastrophe, what would your dollar, time, and **reputation** loss be if you lost all your billing and customer information, or three months worth of CAD drawings? Having your data readily accessible may mean the difference between business as usual and bankruptcy. Like other complex electro-mechanical devices, hard drives failure is not a question of "IF" but "WHEN" — The question is when "WHEN" becomes NOW, will you be prepared?

Tallgrass tape backups are considered the most advanced in the industry; Yet, they are one of the easiest to install. For example, the TG-1140 unit featured below uses your **existing** floppy controller and cable, so it is identical to installing a floppy drive. (In the unlikely event you have difficulty, Tallgrass offers free technical support).

If you already have two floppy drives installed (and no more room on your existing floppy controller/cable), an adapter board is available which allows the use of the tape unit without giving up one of your two floppy drives. In addition, the TG-1140 can be installed in an optional **EXTERNAL** cabinet which permits moving the unit from computer to computer to do hard drive backups. When your needs change, even to the PS/2, you can convert to either internal or external requirements without losing your initial investment in the TG-1140. The TG-1140 is not a compromise. Simply superior technology which guarantees absolute dependability and data restoration over the long haul.

TALLGRASS tape systems are expeditious, reliable, and include **truly** easy-to-use software. Context sensitive help screens lead the way, step by step, through all backup operations. Tallgrass units offer genuinely automatic, unattended backup. Backup options include: Image, File-by-File, AlarmClock, and Changed Files Only. All Tallgrass units come with free technical support, free software upgrades and a **3 year warranty** — quality and support second to none!

	Prod. #	Retail	MicroSell	Shipping
TG-1140, Internal 40/60 Megabytes of storage at a fast 2MB/minute rate; Operates from your existing IBM PC/XT/AT floppy controller; covertible to external and PS/2 use; QIC 40 format	92322	$495.00	$349.00	($8.00)
TG-1140/2, IBM PS/2 version of above model; Convertible to external PC/XT/AT use	92323	495.00	349.00	(8.00)
TG-EXT, External cabinet upgrade kit, converts above models to external configuration for IBM XT/AT, (PS/2 unit available)	92326	179.00	149.00	(8.00)
TG-EAB, Adapter board kit for sharing TG-1140 tape units between computers; also expands internal floppy ports from 2 to 4, (PS/2 unit available)	92325	95.00	79.00	(6.00)
TG-1040I, Internal 40/60 Megabytes of storage at a screaming 3MB/minute recording rate, includes controller for IBM PC/XT/AT & XTREE PRO SOFTWARE, uses QIC 100 format — provides **program execution** from tape and selective file updates without prior tape erasure	92320	695.00	549.00	(8.00)
TG-1040e, External version of the above model	92321	995.00	749.00	(8.00)
TG-9000S, Additional controller kit for sharing TG-1040e units between computers	92324	175.00	139.00	(6.00)

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HARD DISK DRIVE STORAGE

The specific hard drives listed below as KITS include 8 bit (PC/XT type) Western Digital controller and cable.

Seagate

MiniScribe = Solutions for Data Storage

5.25" Hard Drives For PS/2, See 3.5" Hard Drives

	Prod. #	Retail	MicroSell	Shipping
SEAGATE ST225 KIT, 20 MB half-height, 65 MS Average Access Time	94120	$ 399.00	$ 269.00	($7.00)
SEAGATE ST238 KIT, 30 MB half-height, RLL, 65 MS Average Access Time	94130	429.00	299.00	(7.00)
SEAGATE ST251-0, 42 MB half-height, 40 MS Average Access Time	94140	523.00	369.00	(7.00)
SEAGATE ST251-1, same as above but with 28 MS Average Access Time	94141	638.00	439.00	(7.00)
SEAGATE ST4096, 80 MB full-height, 28 MS Average Access Time	94180	840.00	599.00	(8.00)
MINISCRIBE MS3650, 42 MB half-height, 61 MS Average Access Time	94142	474.00	349.00	(7.00)
MINISCRIBE MS3053, 44 MB half-height, 25 MS Average Access Time	94143	799.00	469.00	(7.00)
MINISCRIBE MS3085, 71 MB HALF-HEIGHT, 22 MS Average Access Time	99134	995.00	739.00	(8.00)
MINISCRIBE MS6085, 71 MB full-height, 28 MS Average Access Time	94171	1190.00	589.00	(8.00)
MINISCRIBE MS3180, 157 MB HALF-HEIGHT, ESDI, 17 MS Average Access Time	94135	1595.00	1199.00	(8.00)

3.5" Hard Drives Can be installed in standard 5.25" opening using bracket available below

SEAGATE ST125, 21 MB half-height, 40 MS Average Access Time	94121	427.00	269.00	(7.00)
SEAGATE ST138, 32 MB half-height, MFM, 40 MS Average Access Time	94131	515.00	329.00	(7.00)
SEAGATE ST157R, 49 MB half-height, RLL, 40 MS Average Access Time	94144	699.00	399.00	(7.00)
SEAGATE 5.25" MOUNTING BRACKET, all hardware and instructions to install 3.5" drive in 5.25" opening	94146		10.00	(4.00)
PS/2 MODEL 25 AND 30 HARD DRIVE INSTALLATION KIT, includes color coordinated faceplate, hardware, and upgraded controller for Seagates above	94147	109.00	89.00	(5.00)
MINISCRIBE MS8425F KIT, 21 MB half-height, 68 MS Average Access Time	94123	459.00	309.00	(7.00)
MINISCRIBE MS8438F KIT, 32 MB half-height, RLL, 68 MS Average Access Time	94133	489.00	329.00	(7.00)
MINISCRIBE MS20-PS25/30, 21 MB drive Kit for PS/2 25 & 30, faceplate, hardware, and detailed instructions to install in PS/2	94136	595.00	349.00	(8.00)
MINISCRIBE MS50-PS30/286, 42 MB drive Kit for PS/2 30/286, software, faceplate, hardware, and detailed instructions to install in PS/2	94137	795.00	479.00	(8.00)

Plus Hardware®

Hard Drive Cards

PLUS DEVELOPMENT HARDCARD, 21 MB, 40 MS Average Access Time, requires only 1 slot	92302	795.00	599.00	(7.00)
PLUS DEVELOPMENT HARDCARD, 42 MB, 35 MS Average Access Time, requires only 1 slot	92303	995.00	749.00	(7.00)

SUPERIOR PERFORMING FLOPPY DRIVES — Internal & External

	Prod. #	Retail	MicroSell	Shipping
5.25" 360K TEAC DISK DRIVE, AT or PC/XT, specify grey or black	98001	$110.00	$ 79.00	($7.00)
5.25" 1.2 MB TEAC DISK DRIVE, AT only, specify grey or black	98004	139.00	95.00	(7.00)
3.5" 720K TOSHIBA DISK DRIVE, AT* or PC/XT, (Requires DOS 3.2 or above)	98002	139.00	85.00	(7.00)
3.5" 1.44 MB TOSHIBA DISK DRIVE, AT* only, (Requires DOS 3.2 or above)	98005	149.00	99.00	(7.00)

Above TOSHIBA 3.5" drives include: Universal mounting kit for 5.25" installation, grey and black faceplates, and instruction manual.

3.5" PROCOM EXTERNAL**, 720K, for PC/XT/AT, (Requires DOS 3.2 or above)	92990	395.00	279.00	(10.00)
3.5" PROCOM EXTERNAL**, 1.44 MB for AT only, (Requires DOS 3.2 or above)	92991	425.00	299.00	(10.00)
5.25" PROCOM EXTERNAL**, 360K for IBM PS/2 MODELS 30, 50, 70, and 80	92300	390.00	279.00	(10.00)
5.25" PROCOM EXTERNAL**, 1.2 MB for IBM PS/2 MODELS 30, 50, 70, and 80	92301	450.00	299.00	(10.00)

*Some older models of the IBM AT will require a supplemental software driver available at an additional cost

**All External floppy drive units are from PROCOM TECHNOLOGY. Features include: low profile design, clear Instructions, and all necessary hardware and software. PS/2 Installations must have only one existing floppy drive, while PC/XT/AT installations require an available slot; PC/XT/AT installations can have two internal floppies co-exist with external unit

Micro$ell is authorized to sell all Toshiba, NEC, Panasonic, Mitsubishi, Princeton Graphic, Magnavox, Tallgrass, Paradise, Everex, Quadram, Logitech, Datavue, Seagate, Miniscribe, Citizen, Video Seven, and Star products. Call today and request our latest catalog.

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WESTERN DIGITAL CONTROLLERS

	Prod. #	Retail	MicroSell	Shipping
WD-XTGEN, 8 bit (PC/XT) MFM hard disk controller	94010	$ 75.00	$ 55.00	($6.00)
WD-27X, 8 bit (PC/XT) RLL hard disk controller	94011	85.00	65.00	(6.00)
WD-1003V-MM1, 16 bit (AT) MFM AT hard disk controller, 2:1 Interleave	94012	150.00	115.00	(6.00)
WD-1003V-MM2, 16 bit (AT) MFM AT hard disk/floppy controller, 2:1 Interleave	94013	166.00	125.00	(6.00)
WD-1003RAH, 16 bit (AT) RLL hard disk controller	94014	185.00	145.00	(6.00)
WD-1003RA2, 16 bit (AT) RLL hard disk/floppy controller	94015	192.00	149.00	(6.00)
WD-1006V-MM2, 16 bit HIGH PERFORMANCE AT hard disk/floppy controller, 1:1 Interleave	94106	209.00	149.00	(6.00)
WD-1007WA2, 16 bit ESDI AT hard disk/floppy controller, 1:1 Interleave	94017	299.00	239.00	(6.00)
WD-1007WAH, 16 bit ESDI AT hard disk controller, 1:1 Interleave	94018	279.00	229.00	(6.00)

DRIVE CABLES

	Prod. #	Retail	MicroSell	Shipping
PC/XT FLOPPY DRIVE CABLE with pin connector on controller card end	10030		$ 7.00	($4.00)
PC/XT HARD DISK CABLE for single hard drive, (two cables)	10027		8.00	(4.00)
AT HARD DISK AND FLOPPY DISK CABLE for single hard drive (will run two) and two floppies, (3 cables)	10029		10.00	(4.00)

FAX EQUIPMENT AND SCANNERS

JT FAX FEATURES DESCRIBED ON FRONT PAGE OF MICROSELL SECTION.

WE WILL BEAT ALL VALID OFFERS ON THE JT Fax™ Facsimile System for PCs

Facsimile Products

	Prod. #	Retail	MicroSell	Shipping
QUADRAM J.T. FAX, 4800 Baud internal half card, **PC Magazine's "EDITOR'S CHOICE"**, also nominated for their Technical Excellence Award, **InfoWorld's READER'S CHOICE PRODUCT OF THE YEAR**, easiest to use with on line help, Group III compatible, converts documents "on the fly" which results in net transmission speeds higher than other 4800 bps facsimiles. Take the leap to advanced office technology and turn your computer into a FACSIMILE machine today! Designed for IBM PC/XT/AT, PS/2 25 & 30, and 100% compatibles	10230	$395.00	$249.00	($7.00)
QUADRAM J.T. FAX PS/Q, same as above, but designed for PS/2 Models 50, 60 & 80	10232	595.00	399.00	(7.00)
QUADRAM J.T. FAX PORTABLE, pocket-sized unit which transforms MS-DOS compatible laptops, PC/XT/AT and PS/2 computers into a Group III facsimile, connects to serial port, includes AC adapter, and cable, same features as **J. T. FAX 4800**	10231	495.00	396.00	(7.00)
QUADRAM J.T. FAX 9600, internal 3/4 length card, same features as above but operates at 9600 Baud, also transmits and receives in the background while you perform other tasks, optional modem daughter card available	10233	795.00	575.00	(7.00)
THE COMPLETE PC'S THE COMPLETE FAX, 4800 Baud internal, operates in background, polling with retry of busy numbers, and includes software	95502	499.00	299.00	(7.00)
THE COMPLETE PC'S THE COMPLETE FAX, 9600 Baud internal, same features as above, optional 2400 Baud modem daughter card available, and two year warranty	10234	595.00	CALL!	(7.00)
EVEREX EVERFAX, 4800 Baud fax and 1200 Baud modem in one external unit	62006	495.00	395.00	(8.00)

Hand & Page Scanners

The OCR software that is available with the Princeton Graphic Scanner is the second best selling OCR package. It allows you to automatically enter printed or typewritten text into your computer — eliminates the drudgery of retyping. You scan the typewritten pages and the OCR converts the scanned images into editable text that can be further processed with any word processor. This package is used by IBM, NASA, General Electric and the U.S. Government Printing Office. In combination with the scanner, you can teach it to "read" any new characters or symbols, even entire new fonts, in a few minutes. It comes "pre-trained" for the 15 most popular fonts used in the USA, including Courier, Elite, Letter Gothic, Pica, Times Roman and Helvetica.

	Prod. #	Retail	MicroSell	Shipping
PRINCETON GRAPHIC LS300 SCANNER, Single Sheet scanner with Optical Character Recognition (OCR) software described above, includes P.C. Paintbrush Plus graphics program, specify IBM PC/XT/AT or PS/2	11552	$1495.00	$ 899.00	($12.00)
PRINCETON GRAPHIC LS300 SCANNER, with P.C. Paintbrush Plus, but without OCR	11551	1095.00	699.00	(12.00)
PRINCETON GRAPHIC LS300F SCANNER, Flatbed scanner, allows scanning directly from bound material, with OCR and P.C. Paintbrush Plus, specify IBM PC/XT/AT or PS/2	11554	1995.00	1449.00	(15.00)
PRINCETON GRAPHIC LS300F SCANNER, with P.C. Paintbrush Plus, but without OCR	11553	1595.00	1195.00	(15.00)
THE COMPLETE PC'S COMPLETE PC HAND SCANNER/400, up to 2.5" x 14" at 400 dpi, 16-level gray scale with three dithering patterns and continuously adjustable brightness, scale from 10% to 200% of original size, merge together multiple images to create a full page, rotate, crop & pixel edit, and 2 year warranty	95501	249.00	179.00	(8.00)
THE COMPLETE PC'S HALF-PAGE SCANNER, create a page with just two quick scans! scale from 10% to 200% of original size (4" wide by 14" long), 200 dpi	95504	299.00	219.95	(8.00)
LOGITECH SCANMAN, scans a 4.2" x 11" at 400 dpi, ability to scan from images that contain up to 16 colors and display in 16-levels of gray. **Outstanding for desktop publishing, scans a variety of images including logos, photographs, newspapers, etc., can directly import graphic images into WordPerfect 5.0, Ventura, and PFS First Publisher**				
For IBM PC/XT/AT/ PS/2 Models 25 or 30	88168	299.00	235.00	(8.00)
For PS/2 Models 50 and higher	88166	399.00	265.00	(8.00)

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MODEMS

Internal

	Prod. #	Retail	MicroSell	Shipping
ASHER MODEM, internal full-length 300 baud modem, supports XON, XOFF, XMODEM protocols, voice phone autodials up to 250 numbers, includes software, ***FINAL SALE***	10201		**$ 19.00**	($7.00)
EVEREX 1200, PC/XT/AT half card, 100% Hayes compatible, comprehensive installation and software guide included, made in the USA, and 1 year warranty	62001	$124.00	**79.00**	(7.00)
EVEREX 2400, same as above, but 2400 baud, can also operate as COM1-4	62002	249.00	**149.00**	(7.00)
EVEREX 2400 MNP, 3/4 length card with level 4 MNP error correcting ability	62007	279.00	**169.00**	(7.00)
EVEREX PS/2 2400, half card, fully Hayes compatible, with Bitcom software, for PS/2 Models 50, 60, 70, and 80	62005	349.00	**199.00**	(7.00)
HAYES 1200B, half card, without software	61002	399.00	**299.00**	
HAYES 2400B, half card, includes Smartcom III software	61005S	599.00	**449.00**	(7.00)

External

EVEREX
EVER for EXcellence

	Prod. #	Retail	MicroSell	Shipping
EVEREX 2400 MNP, external 2400 Baud modem, includes thorough software guide	62003	369.00	**199.00**	(8.00)
EVEREX EVERFAX, 1200 Baud modem and 4800 Baud fax in one external unit!	62006	495.00	**389.00**	(8.00)
HAYES 1200, external RS-232C, without communication software	61001	399.00	**349.00**	(8.00)
HAYES 2400, external RS-232C, without communication software	61004	599.00	**489.00**	(8.00)

Portable — Can be used by Laptop's Serial port

WORLDPORT 2400 BAUD, PC Magazine's "EDITOR'S CHOICE," world's smallest external modem and the only one with diagnostic LED's, built-in speaker, can be powered by battery or A/C adapter (both included), 100% Hayes compatible, can interface directly with acoustic couplers (when standard modular phone jack is not available, such as in hotel rooms, phone booths, foreign countries), automatic power control to conserve battery, includes Carbon Copy Plus software and two-year warranty, 4" x 2.4" x 1"

	Prod. #	Retail	MicroSell	Shipping
WORLDPORT 2400 PORTABLE, built-in speaker, Carbon Copy Plus software	63000	359.00	**279.00**	(7.00)
MIGENT POCKET MODEM, 1200 Baud, Hayes compatible, battery operable, AC adaptor included, with both 9 pin and 25 pin cables, and software	24101	159.00	**99.00**	(6.00)
HOLMES CORRESPONDENT FOR DATAVUE SPARK or SNAP, 1200 Baud internal, Hayes compatible, and software — **SPARK**	13101	395.00	**229.00**	(7.00)
— **SNAP**	13103	395.00	**229.00**	(7.00)
HOLMES CORRESPONDENT, same as above but 2400 Baud — **SPARK**	13102	495.00	**309.00**	(7.00)
— **SNAP**	13104	495.00	**309.00**	(7.00)

MONITORS

*ALL MONITORS ARE PACKAGED WITH POWER CORD AND VIDEO CABLES
EXTRA CABLES SUPPLIED ARE LISTED WITH EACH MONITOR.

Monochrome Monitors

	Prod. #	Retail	MicroSell	Shipping
PANASONIC MONOCHROME, (# M1220) 12" green monitor, 720 x 350 resolution, includes tilt swivel base & cables, all controls are conveniently located on the front	11545	$165.00	**$ 86.00**	($12.00)
AMDEK MONOCHROME 410A, 12" amber monitor, 720 x 350 resolution, displays 132 column, **Home Office Computing's "EDITOR'S CHOICE"**	11480	250.00	**155.00**	(12.00)
AMDEK MONOCHROME 432A, 14" VGA etched glass flat screen monitor, built-in tilt/swivel stand, 3 resolution modes: 640 x 480, 640 x 350, and 720 x 400, side mounted controls, white or amber phosphor screen available	11481	245.00	**165.00**	(12.00)
PRINCETON GRAPHIC MAX-15, 14" **white phosphor, "Multisync"** type mono monitor, 1024 x 770 resolution, anti-glare screen, tilt/swivel base, accepts input from mono and color cards, PC/XT/AT and PS/2 cables supplied	11512	280.00	**249.00**	(12.00)
MAGNAVOX PROFESSIONAL VGA, (# 7BM749), 14" flat screen paper-white monitor, fully compatible with all 17 VGA modes, includes 15-PIN analog cable and tilt swivel base	11546	310.00	**169.00**	(12.00)

Color Monitors

	Prod. #	Retail	MicroSell	Shipping
QUADRAM QUADCHROME I, 12" CGA compatible RGB monitor, 690 X 240 resolution, .31 dot pitch	10502	695.00	**229.00**	(12.00)
MAGNAVOX (# 8CM515), RGB-80, 13", 64 color palette, 640 X 250 resolution, and tilt stand	11547	499.00	**289.00**	(12.00)

EGA Monitors

	Prod. #	Retail	MicroSell	Shipping
MAGNAVOX PROFESSIONAL EGA (#CM9053), 13" EGA compatible monitor, dark glass, matrix screen, 640 X 350 resolution, 64 color palette, optional tilt swivel base	11548	499.00	**379.00**	(12.00)
MITSUBISHI 1430C, 14" EGA monitor, **"Diamond Matte"** screen for reduced glare and high contrast, 640 x 350 resolution, .31 dot pitch and EGA auto-contrast control	12005	659.00	**395.00**	(12.00)

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MONITORS Continued

VGA Monitors

	Prod. #	Retail	MicroSell	Shipping
PRINCETON GRAPHIC ULTRASYNC, 12" "Multisync" type monitor, 800 X 600 resolution, .28 dot pitch, has automatic picture sizing, includes free PS/2 cable and tilt swivel base	11508	$ 849.00	$560.00	($12.00)
MAGNAVOX PROFESSIONAL VGA (9CM082), 14" VGA only, analog input allows infinite number of colors to be displayed, etched anti-glare, dark face plate, front mounted controls, .31 dot pitch	11549	649.00	449.00	(12.00)
MITSUBISHI DIAMOND SCAN (AUM1381A), 14" "Multisync" type monitor, 800 X 600 resolution, .31 dot pitch, 15.6 - 36 KHZ auto-tracking	12003	899.00	549.00	(12.00)
AMDEK VGA 735 MONITOR, 14" "Multisync" monitor, non-glare etched screen, front mounted brightness and contrast controls, 800 x 600 resolution, **includes tilt/swivel stand**	11483	795.00	599.00	(12.00)
ZENITH (ZCM-1490), 14" flat screen RGB color monitor, 720 X 400 text resolution, 640 X 480 graphics resolution, 50% greater brightness, 70% greater contrast, allows images to appear like a **"backlit slide", PC MAGAZINE'S Technical Excellence Award winner!**	11550	999.00	698.00	(15.00)
MITSUBISHI DIAMOND SCAN (HL660SATK), 16" Hi Resolution monitor, 800 X 600 resolution, 30-64 KHZ, .31 dot pitch	12004	1945.00	1365.00	(15.00)
MITSUBISHI CABLE, optional 15 to 25 pin VGA cable	12009	28.95	16.95	(4.00)

VIDEO CARDS

Monochrome Display Cards

	Prod. #	Retail	MicroSell	Shipping
QUADRAM QUADGRAPH, Hercules compatible graphics card, parallel port, 720 X 348 resolution **FINAL SALE**	10111	$395.00	$ 69.00	($7.00)
EVEREX EVERGRAPHICS PLUS, Hercules Graphics compatible, with 132 column capability and parallel port	10798	109.00	80.00	(7.00)
EVEREX EVERGRAPHICS DELUXE, Hercules Graphics Card Plus compatible supports up to 1024 X 704 resolution in Graphics mode, supports RAMFONTS	10799	159.00	119.00	(7.00)

CGA, EGA, & VGA Color Display Cards

	Prod. #	Retail	MicroSell	Shipping
QUADRAM QUADCOLOR I, CGA, 320 X 200 and 640 X 200 resolutions, 32K video memory, no DOS restrictions **FINAL SALE**	10103	259.00	69.00	(7.00)
QUADRAM QUADEGA+, half card, includes: EGA, CGA, HGA, & MDA, 256K display memory, best selling EGA!	10702	295.00	179.00	(7.00)
QUADRAM QUADEGA+ PROSYNC, half slot graphics card for the IBM PC/XT/AT and Model 30 that supports EGA, CGA, MDA, and Hercules graphics standards, compatible with most VGA software at the 640 X 480 mode, also supports two additional high resolution modes: 640 X 480 and 752 X 410, (Drivers for Windows, GEM, AUTOCAD, and LOTUS 1-2-3 included)	10704	395.00	199.00	(7.00)
QUADRAM QUADEGA+ PROSYNC WITH Q-MOUSE, same as above, with 2 button optical mouse	10704M	544.00	239.00	(7.00)
EVEREX MICRO ENHANCER DELUXE, full features, half card EGA Auto-Switching Graphics adapter, supports MDA, HGC, CGA, EGA, and extended EGA up to 752 X 410/ 640 X 480 on Multisync monitor	10911	199.00	169.00	(7.00)
PARADISE EGA AUTOSWITCH 480, run your software at 640 X 480 resolution on multisync type monitors, switch automatically between all standards	10924	399.00	219.00	(7.00)
ATI EGA WONDER 800 CARD, auto EGA-CGA-MGA display card, VGA emulation displays up to 640 X 480, 132 column, and 2 year warranty	10915	399.00	259.00	(7.00)
QUADRAM QUADVGA, VGA compatible (BIOS LEVEL) graphics board for the IBM PC/XT/AT and PS/2 Model 30, includes both 15 pin analog and 9 pin digital connectors, will also run all other standards	10707	395.00	229.00	(7.00)
VIDEO SEVEN VGA, auto-switching VGA, EGA, CGA, Hercules, & MDA, runs VGA at up to 800 X 600 resolution, supports both analog and digital monitors (digital monitors cannot run VGA), and 3 year warranty	10919	499.00	319.00	(7.00)
VIDEO SEVEN FASTWRITE VGA, 16 bit VGA, 100% register level compatible, GUARANTEED to run all VGA software (even OS/2), backwards compatible with all standards, fits both 8 and 16 bit, free technical support, and 5 year warranty	10921	699.00	419.00	(7.00)
QUADRAM QUADVGA SPECTRA, 16 bit VGA, up to 1024 x 768 resolution, will run all other graphic standards, both digital and analog connectors, includes Ami word processor	10715		CALL!	(7.00)
PARADISE VGA PLUS 16, 100% compatible GUARANTEED, 16 bit, runs up to 400% faster than the IBM VGA, and 3 year warranty	10920	599.00	349.00	(7.00)
RENAISSANCE GRX II, 16 bit VGA, 100% BIOS & hardware register-level compatible with all video standards, supports 9 (TTL) and 15 (analog) pin connectors	10923	499.00	299.00	(7.00)

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PC/XT BOARD PRODUCTS

SOLD OUT

Do you have a 64K or 256K IBM PC/XT and want to upgrade it to 640K? Instead of just adding memory, add additional ports and memory with AST Six Pack Plus.	Prod. #	Retail	MicroSell	Shipping
QUADRAM SHORT RAM OK, half size memory only expansion card, 0K installed, expandable to 384K using 256K and 64K chips, and includes QuadMaster III software	10162	$185.00	**$149.00**	($6.00)
EVEREX "MINI MAGIC" MEMORY ONLY EXPANSION CARD, half card holds up to 576K of memory to fill out the base memory of your IBM PC/XT or compatible up to 640K, uses both 64K and 256K chips on the 3 available banks, includes memory chip test software, print spooler, RAM disk utility software and a 1 year warranty	10183	99.00	**42.95**	(5.00)
QUADRAM LIBERTY PC OK, adds up to 2 MB of expanded memory to IBM PC/XT and compatibles, capable of back-filling system memory to 640K, uses only 256K chips	10163	300.00	**69.00**	(6.00)
QUADRAM EXPANDED QUADBOARD OK, expandable up to 384K using 64K chips, 1 parallel port, 1 serial port, clock/calendar, game port, and includes QuadMaster III utility software; incompatible with Tandy	10136	325.00	**119.00**	(6.00)
QUADRAM EXPANDED QUADBOARD 384K, same as above with 5 year warranty; incompatible with Tandy	10014	595.00	**229.00**	(6.00)
AST SIX PACK PLUS, just what you need for a 64K or 256K PC/XT, adds up to 576K of memory expansion, 1 parallel port, 1 serial port, clock/calendar, and optional game port, includes AST "Superpack" utility software with disk cache and print spooler, 64K installed — **PC WORLD "WORLD CLASS CHAMPION" 1984-1987**	10178	210.00	**139.00**	(6.00)
MAGICTRONICS MULTIFUNCTION CARD, provides floppy drive control for two drives (360K or 720K), parallel port, serial port, game port, and clock/calendar all on one card, optional second serial port can be activated using chip kit product # 10155 (see below)	10146	139.00	**85.00**	(6.00)
EVEREX "MINI MAGIC I/O" MULTIFUNCTION CARD, provides up to (2) DB-25 serial ports (one standard, one optional), 1 parallel port, and clock/calendar with battery back-up, serial ports can be configured as COM1 thru COM4, parallel LPT1, 2, or 3, and 1 year warranty from EVEREX	10184	199.00	**55.00**	(6.00)
QUADRAM GOLD QUADBOARD 64K, expandable up to 640K, CGA graphics, 1 serial port, 1 parallel port, clock/calendar, Keysaver, Poly Windows Desk Plus software, and QuadMaster III utility software *FINAL SALE*	10128	470.00	**169.00**	(6.00)
QUADRAM GOLD QUADBOARD EXPANSION KIT, additional serial port and parallel port for Quadram's Gold Quadboard	10175	99.00	**59.95**	(5.00)
PARALLEL PRINTER CARD, national name brand close out, for IBM PC/XT, half card, includes a high quality shielded parallel/centronic 8 ft. printer cable	10173	85.00	**25.00**	(5.00)
SERIAL CARD, supports two RS-232C ports, 1 standard 25 pin serial port and an optional 25 pin port with the chip kit listed below	10143	45.00	**22.00**	(4.00)
OPTIONAL SECOND SERIAL PORT, for the above listed board chips are easily installed to activate port	10155	25.00	**15.00**	(4.00)
GAME PORT, XT/AT game port with two 15 pin ports to allow installation of **ONE or TWO JOYSTICKS**	10144	21.00	**16.50**	(4.00)
QUADRAM CLOCK/CALENDAR, internal half card for PC/XT, includes clock software, and 1 year warranty *FINAL SALE*	10132	110.00	**35.00**	(5.00)
MAGITRONICS PC/XT CLOCK/CALENDAR, for IBM PC/XT and compatibles, includes software	10190	85.00	**25.00**	(5.00)

PC/XT ACCELERATOR CARDS

	Prod. #	Retail	MicroSell	Shipping
QUADRAM SUPERSPRINT, replaces 4.77 MHZ 8088 processor chip in your IBM PC/XT or compatible with a faster 10MHZ 8086 microprocessor chip, also provides 32K disk cache, 96K image memory, and supports a 10 MHZ 8087 math coprocessor, requires and open expansion slot *FINAL SALE*	10122	$ 595.00	**$169.00**	($6.00)
EVEREX EVERTURBO/12, half card with 80286 12 MHZ CPU turbo for the IBM PC/XT using 8088 microprocessor only, has 8K of 55ns cache memory, supports 80287 math coprocessor, existing 8088 inserts onto card	10380	409.00	**295.00**	(6.00)
TALLGRASS TECHNOLOGIES "SHORT-CUT", plug in power for the IBM PC/XT and compatible 8088 and 8086 base computers, 80286 CPU running at 12.5 MHZ accelerates your PC to 15 times its normal processing speed, other features include: 16K of zero-wait-state cache memory, 80287 math coprocessor support, latest EMS, EEMS, and LIM 4.0 compatibility, and hardware switching between processor modes, backed by a full **2 YEAR WARRANTY from TALLGRASS**	10381	499.00	**299.00**	(6.00)
QUADRAM QUAD386XT, a true 80386 system upgrade for the IBM PC/XT and 4.77 MHZ compatibles, replaces the 8088 microprocessor of the host machine with a **16 MHZ Intel 80386 microprocessor**, and provides an additional 1MB of onboard RAM memory, 90 day warranty *FINAL SALE*	10386	1195.00	555.00	(6.00)
QUADRAM QUAD386XT DAUGHTER CARD, 2 MB installed	10387	1095.00	**CALL!**	(5.00)

COMPUTER COMPONENTS

MOTHER BOARD, high quality XT multi-layer board with 4.77 MHZ 8088 CPU and BIOS chip, board has a full 8 expansion slots and will accept 640K memory, and includes operations manual	20103	105.00	**55.00**	(6.00)
TURBO MOTHERBOARD, hardware and software switchable 4.77-10 MHZ, complete with 8088-1 microprocessor, DTK/EROS BIOS, 8 expansion slots, memory expandable to 640K using 120ns DRAM chips, and operations manual	99410	155.00	**85.00**	(6.00)
PHOENIX BIOS CHIP for PC/XT	50116	35.00	**25.00**	(4.00)
IBM PC/XT/AT REPLACEMENT POWER SUPPLIES, replace the 63W power supply in your PC/XT with a higher output unit. This unit provides enough power for any expansion products and drives while insuring against "brown-out" damage to the motherboard from power drops — 150W SUPPLY PC/XT	99402	89.00	**43.50**	(7.00)
200W BABY AT POWER SUPPLY	99403	145.00	**65.00**	(7.00)
200W AT POWER SUPPLY	99404	145.00	**65.00**	(9.00)
POWER "Y" ADAPTER, for the IBM PC/XT and compatibles, allows splitting one disk drive power line to power two drives	99405		**6.95**	(4.00)

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AT BOARD PRODUCTS

	PROD. #	Retail	MicroSell	Shipping
QUADRAM MIGHTY MEG, an extended memory board for 286 and 386 based systems, 0K installed, expandable up to 14.5 MB of memory, user upgradeable with SIMM modules	10142	$445.00	$189.00	($7.00)
QUADRAM QUADBOARD AT, for 6 MHZ IBM brand AT's only, 128K installed, provides expansion up to 3.5 MB of memory, 2 serial ports and 1 parallel port, (Daughter card available)	10115	540.00	259.00	(7.00)
QUADRAM QUADMEG-AT 128K, adds up to 2 MB of additional memory to an IBM AT, with option to add up to two 1 MB QUADMEG-AT Daughter cards for a total of 4 MB, (Daughter card available) **FINAL SALE**	10169		99.00	(7.00)
EVEREX RAM 3000 DELUXE, 0K, provides up to 3 MB of Expanded (LIM EMS 4.0) or extended memory using 256K DRAM, includes easy-to-use software for configuration, RAM disk, print spooler; 12 MHZ maximum CPU	10185	165.00	99.00	(7.00)
BOCA BOCA RAM AT, 0K, provides up to 2 MB of Expanded (EMS) or extended memory using 256K DRAM, simple menu driven installation program, supports LIM EMS 4.0; operates with up to 24 MHZ CPU, and 2 year warranty	10186	225.00	149.00	(7.00)
BOCA BOCA RAM AT PLUS, 0K, similar to the above, but with 8 MB capability using 1 MB DRAM; operates up to 30 MHZ, and 2 year warranty	10187		CALL!	(7.00)
SERIAL/PARALLEL/GAME CARD COMBINATION, supports one parallel printer port, two serial ports (1 standard, 1 optional), and one game port, for AT class computers only	10145	95.00	48.50	(6.00)
SECOND SERIAL CHIP AND CABLE SET for the above card	10148	25.00	15.00	(5.00)

SOFTWARE

Word Processing

WordPerfect CORPORATION

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WOROPERFECT, best-selling WP package worldwide, latest version	72401	$495.00	$249.00	($7.00)
WOROSTAR PROFESSIONAL, improved version of the original, latest version	77402	495.00	229.00	(7.00)
PFS PROFESSIONAL WRITE, dictionary, thesaurus, address database	84401	199.00	119.00	(7.00)
WEBSTER'S NEW WORLD WRITER, powerful WP that is easy to learn and use	79401	99.95	69.00	(6.00)
WORD FINDER (MICROLYTICS), add-on thesaurus for any program; even DOS prompt	76406	59.95	39.00	(6.00)
SPELLING CHECKER (SIMON & SCHUSTER/WEBSTER'S), for any word processor	76407	59.95	39.00	(6.00)
GRAMMATIK III, PC MAGAZINE'S "EDITOR'S CHOICE" Grammar checker	76460	99.95	79.95	(6.00)
WORD FOR WORD, the industry standard in document conversion, translates documents between word processing systems	76461	89.95	69.95	(6.00)
TYPING TUTOR IV, #1 best-selling typing program, "If you can't type, you can't compute," includes both 5.25 & 3.5 diskettes and the LETTER INVADERS game	76462	49.95	29.95	(6.00)

Integrated Packages

PFS: First Choice

SPC SOFTWARE PUBLISHING

MICROSOFT WORKS, integrated package from the software leader, speller	78407	199.00	129.00	(7.00)
PFS FIRST CHOICE, includes speller and thesaurus, requires 512K	84400	179.00	89.00	(7.00)
WOROPERFECT EXECUTIVE, excellent choice for laptops, fits on one 720K	72403	249.00	109.00	(7.00)
PEACHTREE SOFTWARE PEACHTEXT 5000, WP with thesaurus, speller, and PeachCalc	90403		199.00	(7.00)

Accounting

ACCPAC EASY QUICK START from Computer Associates, a complete general ledger with sub-ledgers for A/R, and A/P; also includes Accpac Easy Payroll and an on-screen tutorial introduction to computerized accounting from Individual Software, the only $100 range accounting system that you may upgrade to higher-end Computer Associates' Programs	90510	169.00	99.00	(8.00)
BEDFORD INTEGRATED ACCOUNTING, PC MAGAZINE'S "EDITORS CHOICE", specifically designed for small business, includes: G/L, A/P, A/R, Payroll, Inventory, and Job Cost, comprehensive support includes 30 days of free telephone support from Bedford	90508	249.00	179.00	(8.00)
DAC-EASY ACCOUNTING, winner of several awards from PC Magazine and PC World, includes: G/L, A/P, A/R, inventory, billing, reports, & FREE getting started support from DAC within 60 days of purchase	90503	99.95	69.00	(7.00)
DAC-EASY BONUS PAC, same as above, but includes Payroll module and tutors for both Payroll and Accounting modules	90502	179.95	119.00	(8.00)
PEACHTREE SOFTWARE PEACHTREE COMPLETE II, includes: A/R, A/P, G/L, payroll, fixed assets, job costing, inventory control and invoicing, extensive report capability, requires hard disk	90404		199.00	(8.00)
TURBO TAX, award winning tax program, prints IRS approved returns on a DOT MATRIX printer, includes more forms than any other personal tax program	90511	79.00	49.00	(6.00)

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Spreadsheets

LOTUS 1-2-3, Version 2.01	76401	CALL!
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VP-PLANNER PLUS, the Risk-Free & educated choice for knowledgeable computer-software consumers	90515	$159.95
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Generic SOFTWARE

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CADD LEVEL 3, New top-of-the-line version now includes: AutoDimensioning, Drafting Enhancements 1 & 2, DotPlot, PenPlot, DeskConvert, and sample drawing-and-symbols disk, this is recommended for the professional who needs a powerful production and drafting design tool, supports mouse, digitizer and expanded memory	65400	$199.00
ESTIMATOR, designed to provide Job Costing for bids, may be used by itself or with Level 3	65413	$189.00

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BATHROOMS	65416	49.00	HVAC	65420	39.00
KITCHENS	65417	49.00	LANDSCAPING ARCHITECTURE	65408	59.00
HOME LANDSCAPING	65418	19.00	RESIDENTIAL FRAMING DETAILS	65421	59.00

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ASTON TATE DBASE IV+	71402	$549.00	PFS PROFESSIONAL FILE	84402	$199.00

VP-INFO, compatible with III+; offers built-in compiler which results in faster running programs, may run on floppy	90516	99.00

Communications

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TORNADO NOTES WITH LIBRARY	76448	78.00
MENU WORKS (Easy Install Menu Program)	76445	24.95
WINDOWS/286	78409	69.00
NORTON ADVANCED UTILITIES	95603	89.95
SIDEKICK PLUS	76444	129.00
DISK TECHNICIAN PLUS	76450	$79.00
LEARNING DOS 5.25" Disks (Microsoft)	78406	39.00
LEARNING DOS 3.5" Disks (Microsoft)	78413	39.00
FAST TRAX Disk Optimizer, PC WORLD'S BEST BUY, PC MAGAZINE'S EDITORS CHOICE	76471	39.95
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Games

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STARFLIGHT	96408	41.95
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FALCON/AT (EGA - #2 selling simulator)	90520	29.95
KING'S QUEST IV	99401	33.95
LIFE & DEATH	90521	39.95
JACK NICKALUS GOLF	90529	29.95
MEAN 18 GOLF	90530	27.95
MEAN 18 FAMOUS COURSE VOL. 3 & 4	90532	23.95
HUNT FOR RED OCTOBER	90522	$39.95
BLACK CAULDRON	90523	27.95
F-19 STEALTH FIGHTER	90524	49.95
LEISURE SUIT LARRY II	90525	33.95
PLATOON	90526	27.95
CHESSMASTER 2100	95405	39.95
JOKER POKER	90527	27.95
JORDAN vs. BIRD	95422	33.95
MAN HUNTER	90528	33.95

	Prod. #	Retail	MicroSell	Shipping
KRAFT KC III JOY-STICK, connect to IBM compatible game ports	27001	44.95	27.95	(5.00)
EPYX 500XJ JOY-STICK, the first high-performance joy-stick specifically designed to fit in the palm of your hand. The curved shape allows for easier, more comfortable handling and higher scores!	27003	47.95	27.95	(5.00)

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AWARDWARE (design and print certificates and coupons)	95416	14.95
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WALT DISNEY'S MATTERHORN SCREAMER (Ages 8 & up)	95421	9.95

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PC MAGAZINE'S DOS POWER TOOLS with Disk	95453	35.95
USING WORDPERFECT 5.0, Que	95454	17.50
DAC EASY ACCOUNTING & PAYROLL MADE EASY, Tab	95455	13.95
MANAGING YOUR HARD DISK, Que	95456	$17.95
RUNNING WINDOWS 2.0/386, Microsoft Press	95457	15.95
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Mail In Orders:

Or if you prefer, use our handy **ORDER FORM** on last page of this section and your order will be processed the same day we receive it in the mail. Please print all the information and fill in the order form completely for faster processing, including product number, a brief description, price, and shipping charges noted in parenthesis throughout the catalog. Also be sure to include a daytime telephone number in case our sales consultants have a question about your order. This will greatly aid in handling and processing your order. If there is no daytime telephone number included on your order and we have a question or problem with your order, you will be notified of the problem in writing, which will cause your order to be delayed.

When placing your order by telephone, please give the sales consultant the code from the upper right hand corner of your address label to receive a FREE GIFT! If mailing in your order, please place the code on the appropriate space provided on the order form to receive your FREE GIFT!

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Micro$ell accepts purchase orders from state supported schools and universities, hospitals, banks, government agencies, and well-rated FORTUNE 1000 companies. These orders will be shipped upon receipt of a hard-copy of your purchase order, which may be mailed to us: (6410 Dawson Blvd., Suite 110, Norcross, GA 30093) or sent by FAX: (FAX No. 404-246-9720). For all new accounts, please send credit information including 3 credit references, bank account number, bank telephone number and contact person, your company's accounts payable representative's name and telephone number, and your D & B number. Terms are NET 30 and payment must be received at Micro$ell within 30 days to retain credit privileges. CONFIRMING P.O.'s must be clearly marked CONFIRMING. Micro$ell reserves the right to refuse P.O.'s on close-out or heavily discounted items, or poorly-rated companies.

Catalog Showroom

When visiting Atlanta, GA, stop in and visit our CATALOG SHOWROOM CENTER which features the same everyday low prices as our Mailorder Catalog. We are located at 6410 Dawson Blvd., Suite 110, Norcross, GA 30093. The Showroom hours are from 9:00 A.M. - 5:00 P.M., Monday through Friday. Hours vary during holiday seasons. Please give us a call during those times.

Types of Payments:

Micro$ell accepts the following payment methods: VISA, MASTERCARD, AMERICAN EXPRESS, and CHECKS (Personal and Company). Checks must be preprinted with the account holder's name, and account number, (address is also helpful, but not required). Orders can be shipped C.O.D. (up to a certain limit), an additional $3.00 plus regular shipping charges is required for all C.O.D. orders, with payment by cash, postal money order or certified check. Pre-approved accounts **only** can be shipped C.O.D. company check.

Shipping

Shipping and handling charges are clearly noted in parenthesis after product information and pricing throughout the catalog. Shipping is sent U.P.S. Ground unless otherwise specified. The minimum shipping charge is $4.00. *Shipping charges will be reduced on most multiple item orders from the prices designated in parenthesis.* Call for pricing. Additional shipping charges are required for U.P.S. RED LABEL (Next Day Delivery), U.P.S. BLUE LABEL (Second Day Delivery), and orders to certain areas of Canada, Alaska, Hawaii, Puerto Rico, and Europe. Shipments to A.P.O.'s and F.P.O.'s will be sent by U.S. Mail (insured) and require additional postage based upon weight of package and insurance amount. Call for exact charges for packages other than U.P.S. Ground shipments and all areas outside the Continental United States.

Returns

See WARRANTY REPAIR & RETURNS on facing page.

Bids & Quotations

Micro$ell will gladly prepare quotations on written bids submitted to us by mail: (6410 Dawson Blvd., Suite 110, Norcross, GA 30093), or FAX (FAX No. 404-246-9720). We will quote on single items, and in some instances can provide further discounts on volume purchases.

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CALL 1-800-352-8844 IN GA 1-404-662-8001

- All prices are subject to change without notice
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- Shipping and handling prices are shown in parenthesis throughout the catalog and should be added to your order (See SHIPPING section for shipments to Alaska, Hawaii, Canada, Puerto Rico, APO's, and FPO's and Europe)
- UPS RED LABEL (Next Day delivery) and UPS BLUE LABEL (Second Day delivery) service available upon request for additional freight charges
- **Check compatibility before ordering; Micro$ell cannot guarantee compatibility**
- **All software sales are FINAL SALES (non-returnable, non-refundable)**
- No Surcharges for use of Credit Card Services (MASTERCARD, VISA, AMERICAN EXPRESS, AND CHECKS)
- Technical Support Staff to offer advice prior to and after the sale — CALL 1-404-662-8001
- Order Tracking capabilities — CALL 1-404-662-8001

ANY RETURNED ITEM IS SUBJECT TO PRIOR APPROVAL, TIME LIMITATIONS, AND A 15% RESTOCKING FEE.

DIVERSE SELECTION

WELCOME TO MICRO$ELL! Our goal is to provide you, the consumer, with the best value available on computer products and accessories. This encompasses not only offering fair, competitive prices, but backing those prices with outstanding sales and technical support. Our catalog offers a diverse selection of computer equipment and supplies from nationally recognized manufacturers. From name brand laptops and peripherals to software, Micro$ell consistently offers low, discount prices. Call us and see why thousands of satisfied customers call Micro$ell again and again for all their computer needs.

WARRANTY REPAIR & RETURNS

We want you to be happy with your purchase. A clear understanding of our policies and procedures will help to insure your satisfaction and repeat business. All merchandise is shipped as received from the manufacturer in the original packaging. Micro$ell's technical support department retests certain products such as laptops and monitors prior to shipment to reduce DOA (Dead On Arrival) shipments. Check the specific manufacturer's product warranty when ordering, as warranty periods vary by product line and manufacturer. While service and repair is handled by the manufacturer, Micro$ell's Technical Support staff will insure that the warranty provisions of our manufacturers are met in a timely and professional manner.

NO PRODUCT CAN BE RETURNED WITHOUT PRIOR APPROVAL FROM TECHNICAL SUPPORT AND THE ISSUANCE OF AN R.A. (RETURN AUTHORIZATION) NUMBER.

ANY RETURNED ITEM IS SUBJECT TO PRIOR APPROVAL AND TIME LIMITATIONS.

DOA's (Dead On Arrivals) must be called in within five (5) days from the receipt date, must receive an R.A. (Return Authorization) number, and returned immediately. Upon receipt of the return, Micro$ell will test the product immediately and exchange or replace it at once if the replacement product is in stock. If out of stock, it will be prioritized for shipment as soon as replacement units are received.

After 5 days from the receipt date, all repairs and replacements must be handled by the manufacturer's warranty provisions.

TECHNICAL SUPPORT can be reached at (404) 662-8001. Do not use the ORDER HOTLINE for technical support questions and obtaining R.A.'s. **It is strictly for placing new orders.**

To return a Product for Repair:

1) Telephone Technical Support and receive an R.A. number.
2) Give Technical Support the following information: your name, the product name, date of purchase, invoice number if available, and a brief description of the problem you are having.
3) Return the product with all cables, software, parts, manuals, etc. in the original box in the same condition as received by you.
4) Enclose a copy of the invoice if available.
5) Write the R.A. number on the outside of the shipping box. If an R.A. number is not visible on the outside of the shipping box it will be refused by our receiving department.

Goods returned for repair will be repaired or replaced at Micro$ell's discretion. Those items which have been damaged due to improper installation or misuse will be repaired upon request at our current technical repair rate, plus parts and shipping.

REFUNDS:

Please familiarize yourself with our policies prior to your purchase. Approved refunds will be in the form of a Micro$ell "store credit".

THERE WILL BE NO REFUNDS UNDER THE FOLLOWING CIRCUMSTANCES:

1) All software sales are FINAL SALES and are non-returnable and therefore non-refundable. Please check for proper disk media prior to placing your order.
2) Items noted in the catalog or described by the sales consultants as "FINAL SALE" items are non-refundable. These "FINAL SALE" items are often close-outs or liquidation items which have been heavily discounted to pass the savings on to you. Therefore these items are non-refundable for any reason. DOA's will be swapped out as described under WARRANTY REPAIR & RETURNS.
3) Items which we do not normally stock that are specially ordered upon your request cannot be refunded.
4) Incompatibility problems with hardware or software in non-IBM machines are non-refundable — we guarantee that our products are 100% IBM compatible. The majority of "clones" will operate without a hitch, but we cannot guarantee clone compatibility due to the multitude of computer designs.

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ALL RETURNS ARE SUBJECT TO A 15% RESTOCKING FEE.

WE APPRECIATE YOUR BUSINESS AND LOOK FORWARD TO TAKING YOUR ORDER!

We are in the process of consolidating our mail list. To continue receiving our catalog, please complete and mail the following coupon to us. If you have not ordered within the last six months or do not complete and return this coupon, you will be deleted from our mail list.

NAME _____

COMPANY: _____

ADDRESS: _____

CITY: _____

STATE: _____ ZIP CODE: _____

DAYTIME TELEPHONE
(AREA CODE) NUMBER: ( ) _____

Thank you for taking time to complete this form!

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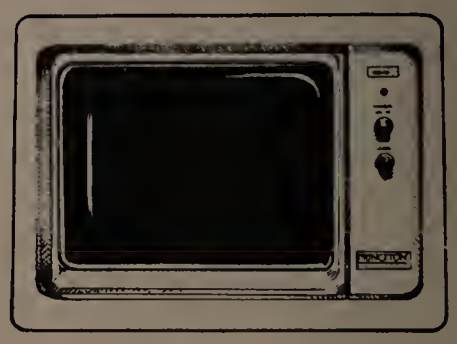
Princeton Graphic Systems
SR-12



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LAN Operating Systems

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Today, business after business is upgrading to a network environment, and is faced with many difficult and complex choices. So complex, that they challenge even the experts.

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The answers are in one place: *Software Digest's* authoritative report on LAN Operating Systems. It's just off the press. *With concrete recommendations based on objective laboratory tests of eight operating systems, including: Vines/386, DataLAN, SFT Netware, 3 + Share, Tapestry II, IBM LAN Server, 10NetPlus, and 3 + Open.*

Our technical staff evaluated each program for ease of learning, ease of use, performance, versatility, and error handling. We put each system through a *series of grueling real-life exercises* measuring important elements such as installation, documentation, and security administration.

In *Software Digest's* new LAN Operating Systems report, you'll also find an *in-depth tutorial* covering all aspects of network technology (including system configuration, connectivity, and performance monitoring)...*comprehensive two-page analysis* on each system, giving you detailed ratings, strengths and limitations, specifications, and prices...*22 performance results...210 verified versatility items*...and the *Master Ratings Chart* comparing all the programs at a glance, and rating each system from best to worst.

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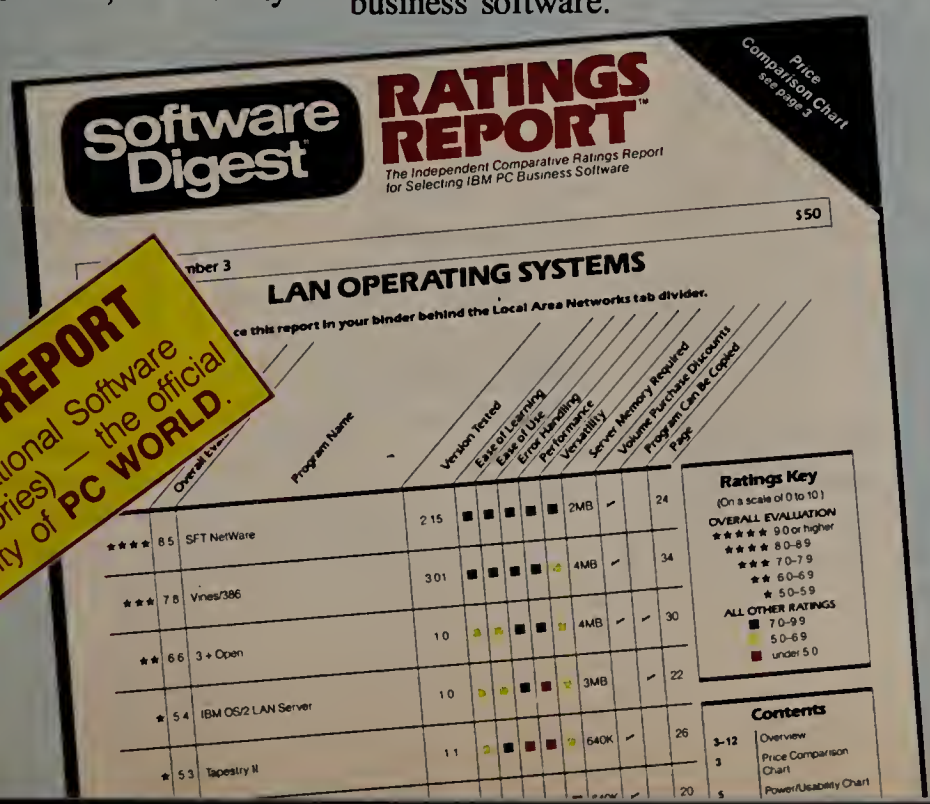

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Software Digest's report covering eight LAN Operating Systems normally sells for $50. But as part of a campaign to identify DP/MIS professionals and PC coordinators, we are offering it for just $25.

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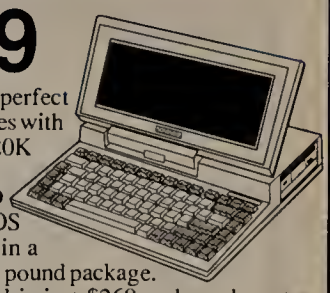

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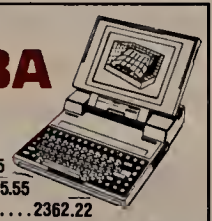

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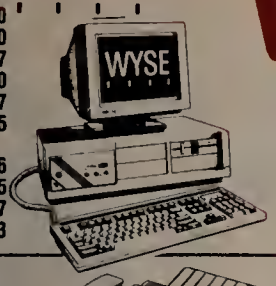

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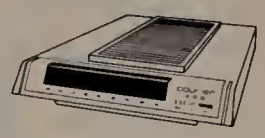

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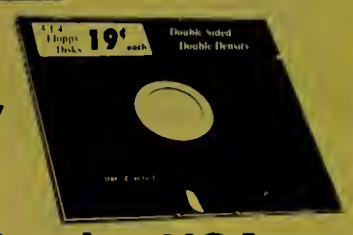

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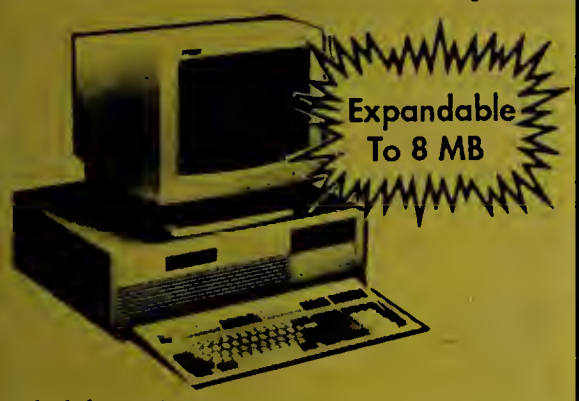

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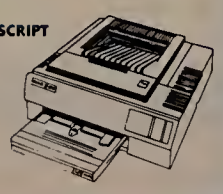

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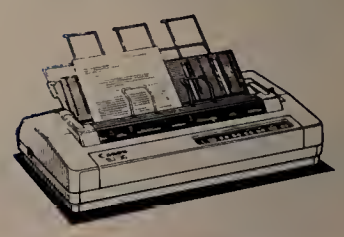

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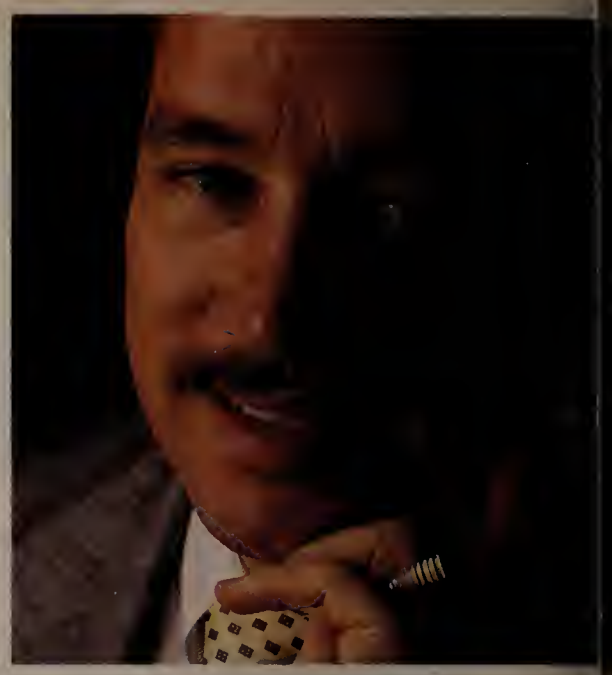
30 DAY MONEY BACK GUARANTEE

A Customer Custody Battle



Steve Goble

The recent divorce of Businessland and Compaq reminds me of how fragile relationships can be in the computer industry. In more mature industries, spats like this are everyday occurrences, but the parties usually reconcile without much fanfare.

Just like nosy neighbors, PC industry pundits close to the couple are gossiping about who was at fault, whether they'll get back together again, and who will get custody of the customers. But the real question is, How will the split between Compaq and Businessland affect the customers?

It isn't a serious worry for some customers—multiple-unit buyers, who started making their own PC buying decisions long ago. For the most part, progressive corporate buyers have long since chosen their PC equipment standards. During their early years, they may have taken a few chances on clones whose names they can no longer remember. But the challenge of connectivity (local area networks and micro-to-mainframe linkages) has matured them.

The large corporation typically shops resellers for price and availability rather than advice or other services. It isn't unusual for high-volume purchasers to receive 30 to 35 percent discounts off list. Since availability is usually tight for the new technology such customers demand, their requirements probably are being met by more than one supplier. This, in turn, forces them to create their own internal support staffs, or contract with third parties, to achieve consistent levels of service.

At the worst, large corporations may be temporarily inconvenienced by having to move a little further down the phone book to the next retailer.

Smaller corporate customers, on the other hand, are more dependent on reseller advice and service, and more susceptible to being hurt.

They also face a tough choice: "Do I change my standard to match what the retailer has to offer, or do I change retailers?" While it may be painful and frustrating, most customers will probably opt for the latter. But other users who don't have standards in place will likely choose the security of a retailer they know.

What about first-time computer buyers? Like newborns, they are probably unaware of the divorce. Even if they do understand the issues, they are more concerned with other matters, like price. Chances are that these buyers would never have paid the incremental price of a Compaq over a clone—regardless of the retailer.

The bottom line, then, is that most users will get through the divorce with only minor inconvenience. Individuals who are properly supported by their corporation won't notice much change. And customers who relied on Businessland are already accustomed to building new relationships, given the high turnover among retailer support personnel.

We may see other divorces, but probably none as sudden or as splashy as this one. There just aren't that many large players, and most would shy away from the negative press. In any event, the end user should survive these minor squabbles just fine. Compaq may lose a few customers, but most of them will find other sources. Businessland seems to be the big loser. ●

Steve Goble is a partner at Paragon Consulting Group, a Dallas-based management consulting firm that serves Fortune 500 corporations.

Have a different perspective? Write Dan Lavin, User Ombudsman, PC World, *501 Second St., San Francisco, CA 94107.*

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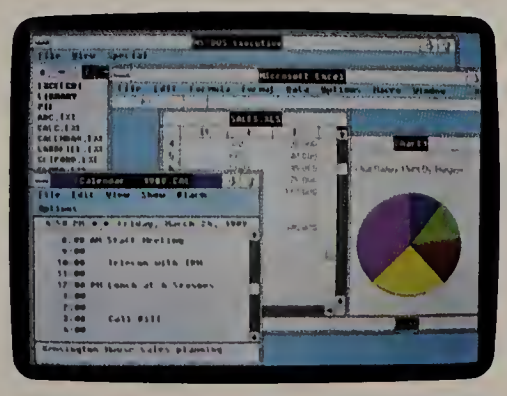

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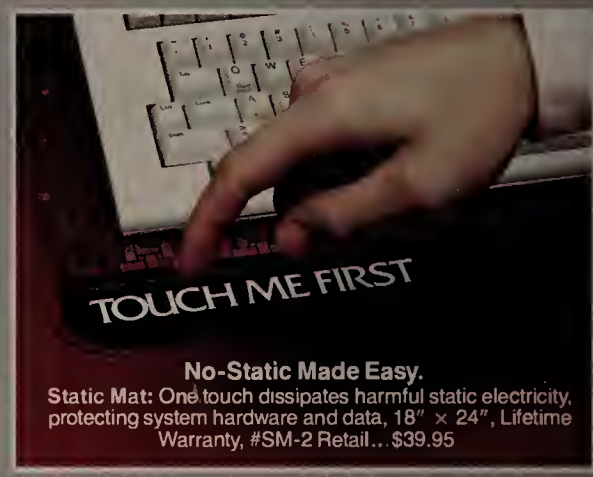

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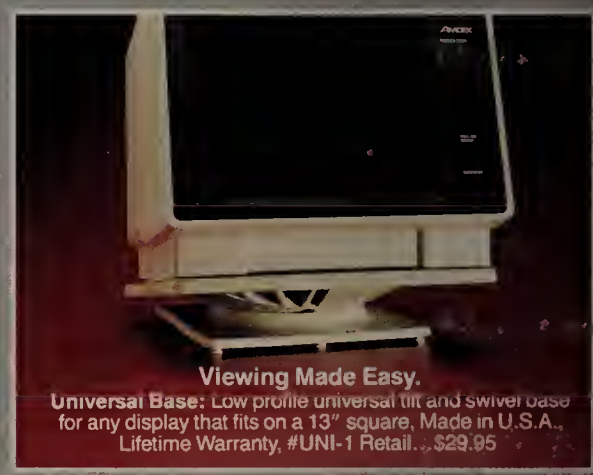

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